The Builder.

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Constructional Steelwork.

MANY books have been written on this subject, some addressed to students, others to architects engaged in actual work, and others more particularly to engineers. Most of these works are largely of mathematical character and do not enter sufficiently into those practical details about which many people would like information. Hence the treatise by Mr. Henry Fidler will no doubt be generally welcomed, although it is not exclusively devoted to architectural steelwork.* Some of our readers are already familiar with the author's method of treatment, for the same subject has already been dealt with by him in Rivington's "Notes on Building Construction."

In the last issued collection of notes no attempt is made to enter into the domain of applied mechanics, regarded as a branch of mathematical science, except so far as may be required incidentally in connexion with some of the matters discussed. Mr. Fidler assumes that his readers have been properly grounded in the theory of construction, and are capable of determining the stresses in any structures which they may be called upon to design. He realises, however, that the ability to produce a correctly calculated stress sheet or an accurate graphic diagram of stresses does not qualify the draughtsman to prepare working drawings capable of passing the ordeal of criticism in the works of the practical constructional engineer, and his hope is that the notes now offered will assist students to bridge the gap very frequently found between theory and practice.

Personal experience of what goes on in the workshop and yard of the structural engineer is seldom if ever possessed by architects, or, for the matter of that, by civil engineers whose training has been chiefly acquired in an office. Some purely professional engineers have served their time in the shops, and others have profited by opportunities for observation during the execution of works in which they have been engaged. But, as builders of girders, roofs, and bridges know only too well, very few engineers are capable of turning out working drawings fit to go straight into the workshops without previous correction.

If engineers are thus found lacking it is but natural that architects should be still more deficient, for it would be absolutely impossible for the architectural student to serve an apprenticeship in the shops pertaining to every one of the numerous mechanical arts which he is expected to utilise in after life.

No one supposes that the teachings of experience can be imparted by books alone, but it is an undoubted fact that books of strictly practical character may be of great assistance, especially if they conduce to the habit of observing and studying good examples of design in the various stages between the drawing office and final realisation on the site.

While recognising the many admirable features of Mr. Fidler's book, we are bound to say that in some respects it complies less fully than could be desired with what we understand to be the main object for which it was written. For instance, the first two chapters, discussing respectively the physical and chemical qualities of mild steel and rolled steel sections, are unnecessarily expanded and occupy space that could have been more usefully devoted to details of practical design. It is quite appropriate that some data should be given relative to the material whose uses are illustrated in succeeding pages, but to occupy nearly a quarter of the entire volume with purely introductory matter seems to be scarcely necessary.

Nearly fifty pages of Chapter I. are taken up with tables giving the results of physical tests and chemical analyses of steel. None of the tables of tests indicate the chemical composition or method of manufacture of the steel tested, or the names of the authorities by whom the tests were made, and, so far as we can see, their chief use is to enable the reader to gather average values which could have been stated with sufficient clearness in two or three pages. There is a somewhat obscure reference in a footnote on page 17 to the fact that some tests and chemical analyses were carried out by Mr. R. H. Harry Stanger, and we think the author may mean to imply that all the tests mentioned in Chapter I. were conducted by that

* "Notes on Construction in Mild Steel." By Henry Fidler, M.I.C.E. Longmans, Green, & Co. London. 1907.

gentleman. If we are right in this interpretation additional interest attaches to the results in question, because Mr. Stanger has had very extended experience in the testing of structural steel for the Works Department of the Admiralty.

Chapter II., dealing with rolled steel sections, might also be condensed without serious disadvantage. Seeing that elaborate books are issued by numerous rolling mills and steel merchants giving minute particulars of structural sections, and that the sizes and properties of British Standard Sections are to be found in the publications of the Engineering Standards Committee, it was not absolutely necessary to occupy some ten or twelve pages of his valuable space by less fully detailed tables of the same kind. In justice to the author we must here say that some useful remarks upon the suitability of different sections for specific purposes are interspersed among the tables. This commendable feature is one which we hope will be further elaborated in new editions of the treatise.

Passing away from these introductory chapters, we are pleased to find that in Chapter III. the author plunges without more ado into the main object of his book. After some welcome remarks upon rivets and riveting, riveted girder-work comes under consideration. The theory of the beam, methods of determining moments and stresses, are not discussed for the reason already stated, and the treatment adopted is to illustrate practical methods of construction by selected examples of girder-work as applied in bridge construction, machine shops, travelling cranes, roofing, and water tanks. This chapter contains numerous reproductions of working drawings from which many useful hints can be gathered concerning the proportions of girders, the arrangement of riveted joints, and the manner in which work ought to be set out by draughtsmen. So strongly do we recognise the value of the examples given that we are led to regret that the author has not dealt with a larger and more varied selection of girder types, so as to cover the chief varieties applied in modern practice. Space could easily be found for the matter here suggested by omitting the descriptions and illustrations of cast-iron bridge piers, cast-iron pipes, and cast-iron tank design, and attention to other auxiliaries which are important in themselves, but do not constitute construction in mild steel.

In the next chapter some introductory remarks on the design of columns and struts distinguish the practical from the ideal column, and very properly emphasise the necessity for considering the effects of transverse stresses arising from eccentric loading. Another point raised is one that should be more generally remembered, namely, that it is not always easy to determine whether a column should be considered as flat-ended or round-ended. The author does not mention fixed-ended columns in this connexion, possibly because he regards the fixity of column ends as being outside the practical politics of design. However this may be, it certainly is the fact that the condition of fixity is very rarely attained in actual work.

While avoiding calculations, Mr. Fidler gives a very interesting series of diagrams illustrating the strength of columns for different ratios of length divided by least radius of gyration. In these diagrams are plotted the results of experiments by Hodgkinson, Christie, and others on columns of various forms; and in a second series of diagrams curves are given for the breaking weights of columns as calculated by Professor Claxton Fidler, "an American authority," and "another American authority." We are sorry the names of the American authorities are withheld, because specific references are always desirable wherever scientific results are quoted.

Many familiar forms of rolled sections lend themselves readily to the construction of built-up columns, a fact which is aptly illustrated by a number of diagrams in Mr. Fidler's book. Good advice is given to the designer to the effect that, wherever practicable, he should equalise the radii of gyration about all axes, while disposing his metal at the greatest possible distance from the neutral axis, and we are glad to see that the author calls attention to the relative economy attending the adoption of the various structural sections as elements of column construction. In the remaining part of the same chapter there is a most useful sequence of drawings illustrating the column design, bases, caps, and connexions with girders.

A subject specially appealing to our readers is the use of mild steel in roof construction. It would manifestly be too much to expect anything like a full exposition of steel roof design in one chapter of a work like the present. Realising the difficulty before him, Mr. Fidler has wisely abstained from any attempt to deal with the main features of roof construction, and has confined himself to suggestions on points of detail. The hints and drawings here given form a useful addition to the more general course of instruction to be found in ordinary text-books.

"The Use of Mild Steel and Iron in Marine Engineering" is a heading which opens up a long vista, and would demand an entire volume for adequate treatment. In the chapter devoted to this branch of construction Mr. Fidler deals chiefly with jetties, bollards, and caissons, and travels somewhat beyond the limit imposed by the title of his book by discussing structures wherein cast iron and cast steel are employed as structural materials. Those who are interested in the construction and equipment of jetties and wharves will find serviceable details in the example here selected, and we specially commend to dock and harbour engineers the treatment of sliding and floating caissons for dock entrances and as applied in breakwater construction. This class of work is one in which the author has had much experience, and his notes upon it constitute one of the most valuable portions of the present treatise.

Finally, we have a brief synopsis of methods and materials employed for the protection of steel from corrosion, a matter which should always receive serious consideration by designers, whether architects or engineers. While no substance in the nature of paint has yet been discovered capable of protecting metal surfaces from the action of air, moisture, and corrosive gases, the process of oxidation can be retarded to a very considerable extent by the use of paint in the first instance, and by careful repainting at proper intervals as time goes on. An important thing for the designer to bear in mind is that all parts of his steelwork must be accessible for scraping and repainting, except, of course, the inside of box girders and hollow columns which are sufficiently protected by closing the ends.

The complete removal of mill scale is always desirable before the work is painted. This end is generally attained by "pickling," and subsequent oxidation is prevented by a coating of boiled oil over which the first coat of paint can be applied. Some difference of opinion prevails as to what is the best paint for protecting steelwork. Mr. Fidler does not commit himself to a definite statement on this question, being content with the prudent remark that "none is perhaps more generally considered as one of the best, or at all events more frequently employed, than the well-known oxide of iron paint." The great trouble, as we have pointed out on previous occasions, is to find a medium offering an impenetrable barrier to the passage of moisture. So far as architectural practice is concerned, the most reliable safeguard is to embed columns and beams in Portland cement, mortar, or concrete wherever such treatment is suitable.

OUR NATIONAL GALLERIES.

By JOHN HONEYMAN, LL.D., R.S.A.

ALTHOUGH the Bill introduced towards the close of last session under the title of "The National Gallery (Scotland) Bill" attracted little attention in England, its progress was watched with keen interest and not a little anxiety by the parties immediately interested and others in Scotland, for the delay which had occurred in dealing with this matter since the issue of the Report of the Departmental Committee on August 10, 1903, seemed to justify the fear that Parliament intended to take no action on that Report. The matter had been handed over to three Scottish Secretaries in succession, but nothing had been done when the change of Government occurred and the office of Secretary devolved on Captain Sinclair. It would not have been surprising if he, new to office and beset with the worries inseparable from such a position, had caused still further delay; but he at once sought full information on the subject, and by a rare combination of sagacity, firmness, and tact managed to produce a measure which has the rare merit of being quite satisfactory to all the parties affected by it.

The Royal Society of Edinburgh, at first obstructive, is pleased, as it well may be, having obtained very much superior accommodation than it ever had in the old Institution building, besides other favours. The Royal Scottish Academy is also satisfied, and the promoters of the new School of Art for Edinburgh have reason to rejoice. Yet, strange as it may seem, the institution specially mentioned in the Act—the

National Gallery—is left almost exactly in the same unsatisfactory position as formerly, the only difference being that it will in future be under the management of a Board of Trustees appointed by the Secretary instead of the old Board of Manufactures, and that its accommodation will be enlarged. But its revenue is not to be supplemented by a Government grant, as was expected. It is to depend on the leavings of the Scottish annuity, or on such portion of these as the Secretary's Board may see fit after they have paid the whole of the salaries and other annual expenses connected with the National Gallery, the Portrait Gallery, and their own Department. As the total amount of the annuity is 2,000*l.*, some idea may be formed of the probable annual balance which may be—but that is at the discretion of the Board—applied to the purchase of pictures or otherwise for behoof of the National Gallery.

It will thus be seen that, as the Gallery is still to be dependent only on money admitted by the Treaty of Union to be Scotch, it has some title to be called a national gallery in a restricted sense; but in reality, while this arrangement exists, it can only take rank as a badly-endowed municipal or provincial gallery, not to be compared with those of Glasgow, Liverpool, Manchester, and other large towns. Strictly speaking, it is not a national gallery, and never can be, for the Scottish nation as an independent political entity has no existence. It is an integral part of the United Kingdom which can only have one King, one Parliament, one Exchequer, and one National Gallery.

Captain Sinclair is not responsible for the anomalous position of the Scottish Gallery. In dealing with it he was brought face to face with a perplexing dilemma. If he advised that the Gallery and its collection should be handed over to the Corporation of Edinburgh as the nucleus of a Municipal Art Gallery he would have met with opposition in all directions; or if, on the other hand, he had asked Parliament to vote a sufficient sum to enable the Scottish Gallery worthily to maintain its position among the many Continental galleries, and therefore to some extent to become a rival to the British Gallery, his proposal would certainly have been vetoed "without a division." For, although Parliament sometimes does foolish things, we can hardly imagine it doing anything so absurd as setting up two independent institutions likely to be competitors for the same objects while drawing their resources from the same treasury.

I have ventured to propose an alternative scheme which, I believe, would remove all difficulties, allowing the Gallery to retain the status and title of a National Institution and to share in the funds drawn from the Imperial Treasury. To effect this desirable end all that is needed is to transfer the Gallery and its collection to the Trustees of the British National Gallery—to make it, in short, an extension or branch of the central institution.

It would, no doubt, be possible for the Government to devise some scheme by which the three rival Boards would be prevented from openly bidding against each other; but this should, and necessarily would, be favourable to the British Gallery and adverse to the two galleries which had only a sentimental claim to be considered national. The result would be the same in any case—the best works would be secured by the first, and the other two might compete if they chose for works which the National Gallery did not care to have; so that, in the long run, the national collection would be incomparably superior to the two nominally national collections.

In these circumstances it must be obvious to any unprejudiced person that it would be wiser to consolidate the organisation of our national galleries, to concentrate our efforts on perfecting one collection under one Board of Trustees responsible not merely for the maintenance of galleries in London, but also for at least two others—one in Edinburgh and the other in Dublin—so that the people within easy access to these places may have some share in the advantages to which we are entitled as contributors to the expenditure of the State—past and present—on the British National Gallery. For it must be remembered that the cost of that institution is not drawn from England alone, but in fair proportion from Scotland and Ireland also, so that a claim to some share in the benefits is only reasonable. In short, we do not suggest giving up a Scottish right, but rather the recognition of a Scottish claim.

As by the Act of 1906 the Galleries on the Mound now belong to the State, it would be a simple matter for the State to hand them over to the National Trustees, and we do not see that there should be any difficulty in arranging for the Trustees acquiring the collection also, which contains several valuable works worthy of a place in any "gallery."

The immediate result of the change would be greatly increased interest in the Edinburgh Gallery. The vacant space there being filled up by noble examples of many schools—international in the widest sense—would change the whole aspect of the place and prove attractive not merely to artists and art students, but to lovers of art generally throughout Scotland and the North of England. This increased interest would have another favourable effect. It would distinctly tend to beget or foster any inclination the possessors of valuable art treasures felt to give or bequeath these to the nation; for, with the Trustees of the National Gallery as custodians, they would have confidence that their gifts would in all time coming be protected and properly cared for.

As a section of the National Gallery, the interest in the Edinburgh collection would always be maintained by the periodical interchange of pictures. I do not mean by a few pictures being sent down for a short time, but by a large number being allowed to remain for a period of not less than five years or more than ten, so that it might be worth while to print a catalogue which would be accessible in London as well as in Edinburgh, and also in order that Scotch students should be able to take full advantage of the collection. It may be necessary to retain some works permanently in London and others in Edinburgh, but as a rule works bought at the expense of the country should be interchangeable. I must not, however, descend into details here, my purpose being merely to show in general terms how advantageous the suggested change would be and how reasonably Parliament might be asked to sanction it. It has at least this to commend it to the National Trustees: that it would immediately put them in possession of additional accommodation, which might be greatly increased if desired at a trifling cost compared with the extension of the galleries in London, which is now hardly practicable.

On the other hand, the Trustees in Edinburgh, relieved of all care of the Gallery there, would have their annual grant of 2,000*l.* to dispose of in the interests of art in some other way, and would probably require to be reminded that it is Scottish—not Edinburgh—money. The Scottish Board would retain the care of the Scottish National Portrait Gallery—an institution chiefly of local interest; but the Scottish Secretary would be free from all further trouble in connexion with the National Galleries—unless, indeed, he were made *ex officio* a member of the London Board of Trustees—an arrangement which would have much to recommend it.

The only opposition to such a scheme as I have suggested is likely to proceed from those hyper-patriotic Scotsmen who are fond of posing as the heroic champions of "Scottish rights," but seem incapable of rising to the idea that as subjects of King Edward VII. they have a birthright claim to duty, honour, and privileges far exceeding in value any they, as Scotsmen, have ever been asked, or hereafter can be asked, to forego. In the present instance no Scottish right is interfered with, but a British right is claimed. We say that the people of Middlesex and Surrey have no more an exclusive right to the use of the British National Gallery than the people of Lanark and Midlothian. They have unquestionably a valid claim to a much larger share of its advantages than we; but we are, for the same reason, entitled to *some* share, and that we claim as a right.

Fortunately this is not a party proposal, for the issue is a simple one, and the facts bearing upon it are easily understood. If it is made evident that the change suggested would conduce to economy, efficiency, the advantage of art students and the advancement of art culture in Scotland generally, there would be good grounds for bringing it in as a substitute for the scheme foreshadowed by the Scottish Secretary. In a case of this sort the advantages of consolidation are obvious. Devolution in the management of rival State galleries in one United Kingdom will not pay, and Scotsmen at least are credited with a preference for what will pay. What Irishmen may prefer in the present circumstances it is impossible to foresee—buoyed up by the prospect (if not the promise) of devolution to any length they choose to go, and that the Milesian millenium is at last within sight, they might decline to accept the advantages they are entitled to share with their Scottish fellow-subjects, preferring to

maintain their own national collection under their own parliament by grants from their own exchequer. We must leave Irish Nationalists and Home Rulers to speak for themselves.

NOTES.

The London Building Act, 1894.

THE case of London County Council *v.* Hancock & James, reported at length in the *Builder*, March 30, again draws attention to a difficult question which constantly arises under the London Building Act, 1894. The question brought before the Divisional Court was whether a showcase which stood on the respondents' own property at their front entrance, which was approached from the street by four steps, was a "structure" projecting beyond the general building line within the meaning of sect. 22, subsect. 1 of the London Building Act. The building line in the street in question had been fixed so as to go beyond the bay windows in the houses in the street, and the showcase in question projected little if at all farther than the bay windows. The court held it was not a structure, following the case of London County Council *v.* Illuminated Advertisements Company, commented upon by us May 21, 1904. The present case is a weaker one than the Illuminated Advertisements case, since the structure was not attached to the building at all, whereas the advertisement cases were supported on supports cut into and pinned through the front walls of the building. In the case London County Council *v.* Schewzik (1905), where an iron framework filled in with glass for an illuminated sign was bolted on to the front of the building, the Lord Chief Justice stated the law very concisely. In the Law Reports he is reported as having said: "Sect. 22 is a building section, and it does not extend to or include things which are added on to buildings." In the Illuminated Advertisements case the basis of the decision was the non-permanent character of the structure. It would appear that, if sect. 22 has no application to things added to buildings, they would fall within sect. 73, subsect. 8, which prohibits any projection from buildings extending beyond the building line, but in the case of Hull *v.* London County Council it was held that sect. 73 applies only to projections forming part of the building. The sign in that case was supported on brackets; a space of six inches intervened between the back of the case and the front wall. The decision in this latter case has been questioned both in the Illuminated Advertisements case and London County Council *v.* Schewzik; but the courts being only courts of concurrent jurisdiction—Divisional Courts—felt themselve bound by the first decision, and that case can now only be overruled by the Court of Appeal. It is to be observed that in London County Council *v.* Schewzik the court intimated that such structures could be dealt with under sect. 102 of the London Building Act, or—more doubtfully—under sect. 164. In Hull *v.* London County Council the court also expressed the opinion that the matter could be dealt with under sect. 164 by bylaw, or under one of the Metropolitan Police Acts, or sect. 119 of the Metropolis Management Act, 1855. It is curious with this choice of remedies that the County Council should again have proceeded under the London Building Act, 1894, unless the opinion of a higher tribunal was desired by further appeal.

Barking Reach.

SEEING that for six years past the Thames Conservancy have been dredging Barking Reach, it is not a little disappointing to learn that the general condition of the navigation channel has not been improved, although the depth is somewhat greater in places than before. According to the annual report of the Board, about 940,000 cubic yds. of material have been removed during the year ended December 31 last, but, as a set-off, some 337,000 cubic yds. of mud were deposited from effluent discharged at the Barking and Crossness outfalls of the London County Council. From the investigations of Mr. Groves, the analyst to the Conservators, it appears that every million gallons of effluent contains solid matter sufficient to deposit 100 cubic ft. of mud. On the basis of statistics published by the London County Council the annual volume of effluents passed into the river in 1904 was 91,216,254,000 gallons, corresponding to about 337,500 cubic yds. of mud, or more than one-third of the quantity dredged last year by the Conservancy Board. It is a truly Gilbertian position to have one public body hard at work scooping mud out of the river and another public body pouring it in with almost equal industry. The Conservancy are quite right in deciding to call upon the County Council to remove or to defray the cost of removing the accumulation of silt in Barking Reach, and to state what measures they are prepared to take for preventing the future discharge of solid matter from their outfalls. We hope the Board will press these points with the commendable firmness they have displayed on previous occasions when dealing with other offenders.

The Mersey Scheme.

WITH the object of preventing the increasingly serious erosion of Taylor's bank, forming the northern boundary of the Crosby Channel, the Mersey Docks and Harbour Board now propose to construct a masonry revetment wall for the length of 2½ miles along the bank. The constant accumulation of sand in the channel necessitates a very heavy outlay in dredging, and the hope is that the cost will be considerably reduced by the construction of the wall, and also that it will be possible to make a further increase in the depth of the waterway. As the Crosby Channel is the main entrance to the Port of Liverpool, the authorities very naturally attach much importance to its improvement, in order that adequate facilities may be afforded for the large vessels at present using the port and for others of still greater size that may be built in the near future. The project to which we refer was prepared by Mr. A. G. Lyster, the engineer to the Board, and having been unanimously approved by a commission including Sir John Wolfe Barry, Sir Benjamin Baker, Sir Douglas Fox, Mr. Vernon Harcourt, and other engineers, there is good reason for believing that the desired end will be attained.

Rail Corrugation.

A NEW contribution to the literature of electric railway and tramway rail corrugation is to be found in the paper read to the Institution of Electrical Engineers by Mr. Joseph A. Panton. In this paper the author confines attention chiefly to the practical side of the problem, and gives details of the method employed by him in investigating the phenomena which have been puzzling the minds of engineers since the general introduction of electric traction. After dismissing briefly the fallacious theory that corrugation is due to variable quality of the steel or to chattering of the rolling mill, Mr. Panton states the reasons which have led him to the opinion that rail corrugation is caused chiefly by bogie frames and trucks of weak construction unable to withstand the lateral strains of heavy cars, the effects of weakness being intensified by unsymmetrically-driven axles. We are bound to say that the author makes out a good case for his theory. It would occupy too much space to discuss the paper in detail, and we must be content with advising those of our readers who are interested in the subject to procure a copy for themselves, and also to follow the remarks of those taking part in its discussion.

Timber Tests.

ONE of the most comprehensive and valuable series of tests hitherto made upon timber is that of which particulars and results are given in a report issued by the West Australian Government. The tests in question, to the number of more than 16,000, were conducted under the superintendence of Mr. G. A. Julius, of the State Railway Department. Bearing in mind the valuable results obtained in the United States from tests of timber containing different percentages of water, Mr. Julius determined the moisture in all test specimens, and has reduced his average values by referring the results to those given by tests of timber containing the standard proportion of 12 per cent. of moisture. The tests covered inquiry into resistance to transverse, shearing, compressive, and tensile stresses, and determinations of weight, hardness, and the coefficient of elasticity. Tests were also made to ascertain the resistance of the timbers to impact and their power of holding spikes. The composition of the sap was determined by chemical analysis, and the influence of the sap upon metals and other materials was made a subject for inquiry. The records contained in the report will be particularly welcome to all who employ hard woods in building and engineering construction.

SCREEN, OAKHAM CHURCH.—A new choir vestry screen has recently been erected and dedicated to All Saints' Church. The new screen is of oak, and designed in the Geometrical style. It has been executed by Messrs. Higgs & Son. Messrs. Tait & Herbert, of Leicester, are the architects.

LETTER FROM PARIS.

M. BOUVARD, the Director of Travaux d'Architecture to the Municipality of Paris, has left for Buenos Ayres, where he is to superintend the transformation of that town by the creation of new quarters, the laying out of new streets and boulevards, and the erection of public buildings. M. Bouvard, who is to return in three months, has taken with him two other architects, M. Faure-Dujarrie and M. Delattre, who will be charged with the carrying out of his plans at Buenos Ayres. It may be mentioned in this connexion, that the Municipal Committee forming the jury in the competition for new façades, has just awarded a prize to the son of M. Bouvard, also an architect, and the author, along with M. Umbdenstock, of a new house in the Avenue Alphand. Four other prizes have been awarded: to M. Benz, for a house in Rue Francois Premier; M. Tourneau (house in Rue Bellechasse); M. Louis Parent (house in Rue Spontini); and M. Pradelle (house in Rue de Luynes).

The President has just presided over the opening, at the Louvre, of a new gallery formed in the last bay of the Grande Galerie, intended to be devoted to the proper exhibition of the works of Rembrandt, which have hitherto been very inadequately shown. These pictures, formerly dispersed about the Museum, are now collected in one room, to the number of twenty-two, from the "Hermit Reading" of 1630 to the "Venus and Cupid" of 1662. M. Redon has arranged them effectively, with a good light, and in their old frames. The collection is completed by the works of some of the Dutch painters who were closely allied to Rembrandt, either as his immediate predecessors, such as Elsheimer and Lastman, or as his disciples, such as Gerard Dow. The large "Visitation" by Jan Lievens, which hangs on the partition separating the new room from the Grand Galerie, completes the installation, which has been carried out under the direction of M. Leprieux, the new curator of pictures in the Louvre.

An interesting collection of ceramics and porcelain has been organised in the rooms of the Musée des Arts Decoratifs, in the Pavillon Marsan, which will remain open till the 15th. The exhibition at the Musée Galliera will open in May.

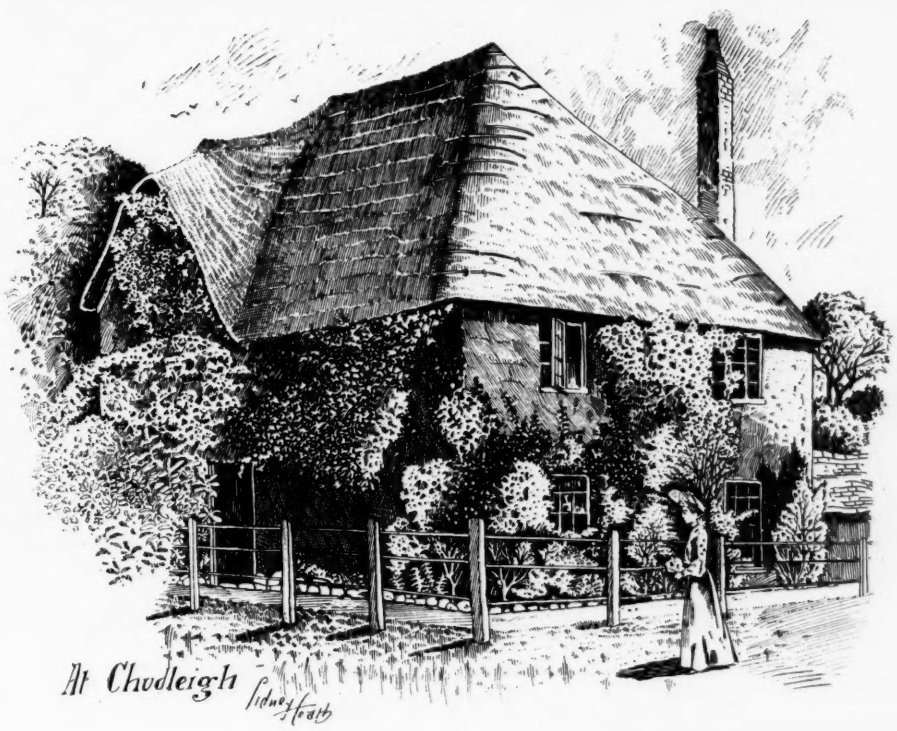
At the Ecole des Beaux-Arts ten architect students have been admitted to compete for the Prix de Rome.

The Société Nationale des Beaux-Arts (New Salon), whose exhibition opens on the 14th, is about to arrange also, at the Château de Bagatelle, an exhibition of portraits of eminent women of the Third Republic, by artists who are members of either Salon. It is to include all the portraits of this class that have been painted, as far as possible. Next year there is to be a historical exhibition of portraits of children, and in the year following, a collection of portraits of eminent men.

The death is announced, at the age of 67, of the sculptor Jean Amy, a pupil of Dumont and of Bonassieux. His first exhibit at the Salon, in 1869, was a stone statue under the title "La Beatitude." In 1874 he carried out, along with M. Boisseau, the statue of Figaro which decorates the offices of the well-known journal of that name, in Rue Drouot. At succeeding Salons he exhibited principally portrait busts of eminent Provençals—Thiers, Mistral, Méry, Cabanel, and others; but among his works may be also mentioned a group entitled "Innocence et Remords," "Thiers Couronné par l'Histoire," and "Le Tambour d'Arcole," also a stone statue for the façade of the museum at Montpellier. He had also in recent years exhibited a series of masks and grotesques. He had obtained a medal in the Salon of 1868, and an Honourable Mention at the Exhibition of 1900.

The Muicipality of Paris are about to exhibit at the Petit Palais an interesting collection of the sculptures of Falguière, as well as the portrait of the late sculptor by M. Carolus-Duran, and his bust by M. Rodin.

HOTEL IMPROVEMENTS, BIRMINGHAM.—The "Acorn Hotel," Birmingham, has recently been enlarged and improved. The work has been carried out by Mr. Thos. Rowbotham, builder, and Messrs. Wood & Kendrick were the architects.



Some Picturesque Cottages. Sketched by Mr. Sidney Heath.

BILLINGSGATE MARKET, AND THE FELLOWSHIP PORTERS.

In view of demands for additional accommodation the Corporation of the City have under consideration the proposed removal of the market to Shadwell or some other site. They took over the fish market at Shadwell from the London Riverside Fish Company five or six years ago with the object of protecting the interests of the City as the market authority rather than of securing an adequate return on the capital outlay—as is stated in the Report of a special committee appointed in 1904. The yearly accounts, however, evince that the expenditure at Shadwell has thus far greatly exceeded the receipts. Seven years ago Lower Thames-street, between Fish Street-hill and Botolph-lane, was widened (from 30 ft.) to 60 ft. at a cost of about 200,000*l.*, towards which the London County Council contributed 50,000*l.* Other local improvements have been made since, and yet, it is found, without a reduction of the inconvenience under which the fish traffic is carried on. Whether the place is named after the British chief Belinus, or after Beling, or Billing, an owner in later times, it is certain that on that spot, by a quay and water-gate near the highway which passed east and west within the ancient wall, a wharf and market existed in a very remote period. For fish-boats paid toll there under the laws of Athelstan, and custom dues were paid, *temp.* Ethelred II. A proclamation of 1297 mentions the "market at Billingsgate"; a collector of the tolls and customs in the markets of Billingsgate and Smithfield is cited in an *inspeximus* copy of a charter of Henry IV. Stow writes that at the end of the XVIth century Billingsgate was

"a large water-gate, port, or harborough for ships and boats commonly arriving there with fish, both fresh and salt, shell-fishes, salt, oranges, onions, and other fruits and roots, wheat, rye, and grain of divers sorts. . . ."

He speaks, too, of the increased service of the port since the passage of the larger vessels to Queenhithe had been obstructed by the disuse of the drawbridge of timber at London Bridge. The harbour and wharves, with the tower and steps by the waterside and the Dutch eel-boats, whose successors still resort thither, are depicted in Wyngaerde's drawing of about 1550, and Nicholas Visscher's long view of 1616 (first edition). An Act of 1 Eliz. c. ii. ordained Billingsgate to be

"an open place for the landing and bringing in of any fish, corn, salt stores, victuals, and fruit (grocery wares excepted), and to be a place of carrying forth of the same, or the like, and for no other merchandises."

That restriction seems to have been aimed at a growing practice of trafficking in general commodities, as there is a record that in 1550 "came a sheppe of egges and shurtes and smockes out of France to Byllyngesgatte." A statute of 11 William III. rendered it "a free and open market for all sorts of fish." J. B. Bunning, the City architect, rebuilt the market sheds in 1849-53, his designs, after the Italian style, comprising the arcade and campanile of red brick and Portland stone, and the large fountain, the drainage being effected by Bessemer's centrifugal pumping apparatus. Subsequent improvements and additions by Sir Horace Jones are illustrated in the *Builder* of October 17, 1874. The City Chamberlain's accounts of last year showed that the income amounted to 25,798*l.*, of which 25,190*l.* came from rents and tolls, and the total outgoings to 22,062*l.* At Shadwell market the income was 2,293*l.*, and the expenses 5,073*l.*

From the once extensive traffic in salt and grain the Company of the Fellowship of Free Porters of the Port of London (whose members were required to take out their freedom) were also styled as Corn and Salt, as well as Billingsgate, Porters. King James I.'s first charter to the Corporation, dated August 20, 1605, confirmed their prescriptive right to exercise the office of meter and metage of all coal, salt, grain, and fruit, edible roots, and all other measurable merchandise carried upon the Thames and the Medway within the prescribed limits. The Corporation exerted their privileges of metage in respect of those goods (coal excepted) through the Billingsgate Porters, whose Fellowship was instituted in, it is said, Edward I.'s time, and was regulated by an act of the Court of Common Council of October 5, 1620. It had previously been under the governance of the Court of Mayor and Aldermen—*teste* Mr. Charles Welch, F.S.A., in a paper read to the London and Middlesex Archæological Society in March, 1895. The Porters' regular employment and monopoly of unloading grain and measuring corn became gradually curtailed by the building of the docks and the passing, in 1872, of the Port of London Grain Act, which abolished compulsory metage on grain. Their number, at one time more than 2,000, was greatly reduced. In the result the Court of Common Council disbanded the Fellowship by an act of 1894. The Rules of the Company sold their property, silver-plate, and other effects for 10,379*l.* 4s. 7d., and the 495 Fellows shared the proceeds, in the form of payments and a few pensions. The property included the Porters' (later) Hall, a freehold of about 650 ft. superficial, No. 17, St. Mary-at-Hill, Lower Thames-street, which realised 4,400*l.*, and had been, with the Corn Meters' Office in Great Tower-street, their headquarters during more than 100 years.

Builders' and Contractors' Column.

THE BUILDING EXHIBITION AT OLYMPIA.

We are devoting a special supplement to the Building Exhibition in connexion with our next week's issue.

We shall be glad to illustrate exhibits if blocks are sent to us which are suitable in size and in other respects. In the case of machines of any kind, technical drawings showing structure are of more value than mere pictures showing the external appearance of the exhibit.

THE WORKMEN'S COMPENSATION ACT, 1906.

In our former paper on this Act (see the *Builder*, March 23) we left over two subjects for consideration—the law as to subcontractors and the liability in respect of industrial diseases.

The provisions of the Workmen's Compensation Act, 1897, as to compensation where subcontractors were concerned were very involved and gave rise to considerable litigation. The extension of the new Act to practically all workmen and the omission of reference to particular undertakings has enabled the law to be somewhat simplified. Sect. 4 deals with this subject:—The person putting out the work on contract is called "the principal," the person undertaking the contract "the contractor," and where "the principal," for the purposes of his trade or business, contracts with the "contractor" for the execution by or under "the contractor" of the whole or any part of the work undertaken by "the principal," the principal is to be liable to pay to any workman employed on the execution of the work compensation as if the workman had been employed by him, but the compensation is to be based on the earnings of the workman from his immediate employer. There are, however, two qualifications to this statement. Firstly, by subsect. 3, the workman is not bound to look to the principal only; he can, if he pleases, recover compensation from the contractor; and, secondly, this section is only to apply where the accident occurs "on or in or about" premises on which the principal has undertaken to execute the work or which was otherwise "under his control or management" (see subsect. 4). There is a further exception in the case of contracts relating to threshing, ploughing, or other agricultural work, where the contractor provides or uses machinery, as in such cases the contractor alone is liable to his own workmen employed by him on such work.

By subsect. 2 the principal, who is liable to pay compensation under this section, is given a right to be indemnified by every person who would have been liable to pay compensation independently of this section.

This section, as we have said, is an improvement on the corresponding section in the Act of 1897, but it involves the decision of some of the questions which caused litigation under the Act of 1897. Thus it imports the limitation of locality, which has in other parts of the Act disappeared. The workman before he elects to proceed against the principal will have to satisfy himself either that he was employed "on or in or about" premises on which the principal had undertaken to execute the work, or which were otherwise under his control—and the question of control has already given the Courts considerable difficulty in determining the doctrine of "common employment" under the common law. Secondly, some uncertainty exists as to the meaning of the expression in this section "for the purposes of his trade or business." In sect. 4 of the Act of 1897 contracts ancillary or incidental to, and no part of or process in the trade or business carried on by the undertakers were expressly excepted, but the above words seem to be intended to bear a wider meaning, and probably will extend to all operations carried on for the purposes of gain. To give an example—under the existing Act—in Bush *v.* Hawes it was held where a builder had entered into a contract to erect a building which was to have an iron roof, and had subcontracted for the erection of the iron roof, that the erection of the roof was ancillary to the trade or business carried on by the builder, there being evidence that he never undertook such work. There can be little doubt, however, that under the Act now shortly to come into force the builder in such a case will be liable to pay compensation to the subcontractor's servants.

It only remains to consider one small point of procedure in which an alteration has been effected by subsect. 2 of sect. 4 of the Act of 1906. Where an undertaker claimed under the Act of 1897 to be indemnified by his subcontractor in respect of compensation paid to the latter's workman, he could proceed by action (see Evans *v.* Cook, the *Builder*, November 19, 1904). The Act of 1906 has altered this, and questions involving the right to, and the amount of, any indemnity claimed under this section, are in default of agreement to be settled by arbitration.

The inclusion of certain diseases as the subject matter for compensation is a new departure, in so far as they are included in express terms, but it must be remembered that under the Act of 1897 certain diseases were held to be included in the word "accident." Thus, the House of Lords, in Brintons, Ltd. *v.* Turvey (the *Builder*, April 29, 1905) held a case of anthrax to be within the Act, but the law was in an unsatisfactory condition, since, in the later case of Steel *v.* Cammell, Laird, & Co. (the *Builder*, May 27, 1906) the Court of Appeal disallowed a claim based on lead poisoning on the ground that no particular date could be proved for the origin of the disease.

The new Act deals with this subject in sect. 8, but this section contains 10 subsections, and the legislation is intricate and involved.

Firstly, the question to be solved is to what diseases does the Act apply? These are set out in the Third Schedule to the Act, and they are:—Anthrax, lead poisoning, or its sequelæ, phosphorus, mercury, or arsenic poisoning, and the sequelæ, and ankylostomiasis; but the Secretary of State may by Provisional Order extend the provisions of the Act to other diseases (see subsects. 6 and 8), the Order being confirmed by Parliament. The Act, moreover, is not so specific as at first sight it appears, for it provides in subsect. 10 that nothing in this section shall affect the rights of a workman to recover compensation in respect of a disease to which this section does not apply, if the disease is a personal injury by accident within the meaning of the Act. This provision leaves open all the questions which created so much difficulty in the former Act.

The scheduled diseases are dealt with as follows:—Where a certifying surgeon appointed under the Factory and Workshop Act, 1901, for the district in which the workman is employed certifies that the workman is suffering from one of the scheduled diseases, or a workman is suspended from his usual employment under special rules or regulations made under the Factory and Workshop Act, 1901, or the death of a workman is caused from such disease, and the disease is due to the nature of any employment in which the workman was employed at any time within twelve months previous, whether under one or more employers, he or his dependants is to be entitled to compensation, and the disablement or suspension is

to be treated as the happening of the accident.

Subsect. 2 becomes material, for in the schedule certain processes are set out in the second column, and it is provided that if a workman at or immediately before his disablement or suspension was employed in any of those processes and the disease is one specified in the first column, then the disease is to be deemed to be due to the nature of the employment, unless the certifying surgeon certifies otherwise or the employer can prove the contrary.

The next question is, Who is liable to pay the compensation? The employer who last employed the workman is primarily liable, but if that employer can prove that the disease was in fact contracted whilst the workman was in the employment of some other employer that other employer is the person by whom the compensation is payable. To enable this question to be determined that other employer can be made a party to the arbitration, and if the disease is of such a nature as to be contracted by a gradual process other employers who employed the man during the twelve months in the employment to the nature of which the disease was due are liable to contribute, the contribution to be settled by arbitration in default of agreement.

Employers will stand aghast at the character of this litigation. The scheduled diseases are diseases which in most cases would be the result of a gradual process. The last employer has to bear the whole compensation unless he embarks on litigation to determine such a difficult question as the exact origin of an insidious disease.

The amount of compensation is to be based on the earnings of the workman under the employer from whom the compensation is recoverable (subsect. 1, (d.)). That appears to be the employer who last employed the workman in an employment to the nature of which the disease was due (subsect. 1 (c.)) or some other employer by whom the last employer is able to prove that the man was employed in an employment which caused the disease to be contracted (subsect. 1, c. (ii.)).

Lastly, it is enacted that if the workman wilfully and falsely represents himself in writing not to have previously suffered from the disease compensation shall not be payable. The original Bill contained a provision that if a workman wilfully conduced to the disease by negecting precautions he should be disentitled from recovering compensation, but this clause was struck out.

The above is the very briefest summary of the provisions of the Act relating to industrial diseases, and the ordinary business man will ask himself whether legislation of such complication was really called for. The latest returns for the first two months of this year show that under the Factory and Workshop Act the total number of cases of poisoning and anthrax was seventy-eight, with an addition of twenty-eight cases of lead poisoning amongst house-painters and plumbers.

THE YEAR'S TRADE FIRES.

According to the Annual Report of the London Fire Brigade, which has just been issued, there were 38 fires on builders' premises in 1906, 43 at buildings under repair or building, 12 on carpenters' and workers' in wood establishments, 14 on contractors' premises, 10 on timber merchants' premises, 4 at shop-fitters', and 1 at a builder's material dealer's premises (cause unknown). The fires were caused as follows :—Builders :—Children playing with fire, 1; defect in flue adjoining, 1; burning rubbish, 1; defect in flue, 1; hot ashes, 2; light thrown down, 18; mineral oil lamp upset, 1; overheat of mineral oil lamp, 1; overheat of stove, 1; overheat of gas light, 1; spark from furnace flue, 1; spark from watchman's fire, 1: spark from locomotive, 1; unknown, 7. Buildings (under repair or building) :—Burning over tar, 2; burning rubbish, 1; escape of gas, 1; defect in flue, 1; hot ashes, 3; light thrown down, 13; light thrown from street, 3; lime slaked by rain, 4; lime slaking, 4; naphtha lamp, 1; spark from fire, 1; spark from furnace, 1; spontaneous ignition, 1; unknown, 7. Carpenters, etc. :—Burning rubbish, 1; hot ashes, 2; light thrown down, 5; overheat of exhaust pipe, 1; spark from fire, 3. Contractors :—Candle, 1; hot ashes, 1; light thrown down, 2; light thrown from street, 1; lime slaking, 1; mineral oil lamp, 1; ditto upset, 1; overheat of manure, 1; spark from fire, 1; spark from locomotive, 1; spark from forge flue, 1; unknown, 2. Timber merchants :—Boiling over tar, 1; candle, 1; friction of machinery, 1; light thrown down, 2; overheat of flue, 1; spark from furnace, 1; unknown, 3. Shopfitters :—Light thrown down, 1; light thrown from street, 1; unknown, 2. The total number of fires in London was 3,843—by far the largest number occurring in private residences, in which there were 1,055 outbreaks. Amongst trades the largest number of fires (79) occurred on licensed victuallers' premises.

VARIOUS.

The Bath Stone Firms are at present furnishing the stone for the following buildings in progress :—

St. Paul's Church, Leyton.—Mr. G. E. Streatfield, architect; the contractor being Mr. W. Saint, of Cambridge (Corsham Down stone).

St. Paul's Presbyterian Church of England, Enfield.—Mr. W. Wallace, architect; Messrs. Allen Fairhead & Son, contractors (Kentish rag with dressings of Monks Park stone).

St. Luke's Church, Well Hall, Eltham.—Mr. Temple Moore, architect; Messrs. Goddard & Sons (Farnham and Dorking), contractors (Monks Park stone).

Wesleyan Church, Sutton, Surrey.—Messrs. Gordon & Gunton, architects; Mr. C. Brightman (Watford), contractor (Monks Park stone).

New County Court and Inland Revenue Offices, Swindon.—H.M. Office of Works; Mr. J. G. Norman (Swindon), builder (Monks Park stone).

The Wesleyan Chapel and Schools at Albert-crescent, Penarth, Cardiff.—Mr. H. Bugden (Cardiff), architect; Messrs. Price, Sons, & Co. (Penarth), builders (Monks Park stone, worked at Penarth by Messrs. Luke, Hooper, & Sons).

The Carnegie Library, Bridgend.—Mr. T. J. Thomas (Bridgend), architect; Messrs. Price & Morgan, builders (Monks Park stone).

Master's House, Eton College.—Mr. Poulter, architect; Messrs. J. Dorey & Co. (Brentford) contractors (Monks Park stone). Memorial Building to Old Etonians.—Messrs. Hall & Greenslade, architects; Messrs. Willcock & Co. (Wolverhampton), contractors (stone from Coombefield quarries, Portland).

Presbyterian Church Hall and Schools, Kensington, Liverpool.—Mr. H. Aspinall (Liverpool), architect; Messrs. E. Burns & Sons, builders (Monks Park stone and St. Aldhelm Box Ground stone).

New Post Office, Newport.—Mr. W. E. Blake (Plymouth), contractor (Portland stone, prepared by Messrs. J. Williams & Son, of Newport).

Messrs. Patman & Fotheringham have obtained the contract for the Palace Theatre, Shaftesbury-avenue, under the supervision of Mr. J. Emblin-Walker, architect.

Messrs. Davis, Bennett & Co., sanitary, hydraulic, heating, and hot-water engineers, have just secured a very large contract in Madrid, amounting to many thousands of pounds, for plumbing, hot and cold supplies, sanitary appliances, etc.

Messrs. William Sprowson & Co., manufacturers of lifts and cranes, have obtained the order from the Great Central Railway Company for three electric lifts for 30-cwt. loads, for goods and passenger traffic, for Guide Bridge Station; and an order from the Co-operative Wholesale Society for three electric goods lifts for loads of 1½ tons and 1 ton, for new preserve works, Middleton Junction.

The Kleine Patent Fire Resisting Flooring Syndicate have obtained the contract for the whole of the flooring and roofs of Messrs. Mappin & Webb's new premises.

The Carron Company (Carron, Stirlingshire), have secured the contract for supplying the whole of the catering departments at the forthcoming Irish International Exhibition, to be held at Dublin, with their "Carron," gas, steam, and coal cooking apparatus. The same apparatus has also been adopted for the Addenbrook Hospital, Cambridge.

A new clock and chimes for Ripon Cathedral have recently been made and erected by Messrs. Wm. Potts & Sons (Leeds). The new dials are 6 ft. 6 in. in diameter, and made to instructions given the makers by the Dean and Chapter of Ripon, having skeleton Gothic centres, and behind the figures filled with bronze metal and painted and gilt.

The dial or motion wheels are made of gun-metal, cut and polished on the engine from the solid; the hands, being made of stout copper and backed with copper, and balanced or counterpoised within. The first blow of the quarter chimes at fifteen, thirty, and forty-five minutes past the hours denote the correct Greenwich time, whilst at sixty minutes past the hours, the quarter-chimes are struck a little before the correct time, and the exact time is denoted by the first blow of the hour hammer.

The clock frame is fixed on girders built into the walls of the tower, giving a firm foundation for the clock to rest upon, all the bushes or bearings being of gun-metal screwed into the frame, so that each or any wheel may be removed separately without disturbing the others. The escapement is the double three-legged gravity by Lord Grimthorpe, with a 1¼ seconds pendulum with a 300-lb. bob, which is cylindrical in form, and regulating cup attached for finer adjustment.

Messrs. Wm. Potts & Sons have also received instructions from the Rector, Wardens, and Committee of Bovey Parish Church (Devonshire) to erect a new quarter-chime clock, with large dial, painted black and gold, facing the east; this is now in hand, and will be fixed shortly. The firm are also making a large clock for Newcastle-on-Tyne, and three large illuminated dials for a clock for Leeds; and have also completed a new turret clock at Wilmslow Cemetery, Cheshire, and a new large turret clock for the Urban District Council, Castleford, Yorkshire.

A FERRO-CONCRETE PILE CASE.

In June last proceedings were instituted against some infringers of Hennebique's patent for concrete piles. Mr. Justice Warrington gave then a verdict in favour of Mr. Hennebique's patent, ruling that it was perfectly valid, and that the opponent's work was an infringement. That verdict has just been reversed by the Court of Appeal. Mr. Hennebique is advised that the Bench took an erroneous idea of the case, and he has decided to carry the matter to a higher court.

Architectural Societies.

GLOUCESTERSHIRE ARCHITECTURAL ASSOCIATION.—A meeting of this Association was held recently in the Town Hall, Cheltenham, the President (Mr. F. W. Waller, F.R.I.B.A.) being in the chair. Messrs. H. H. Stanley and C. B. Lyne were elected Associates. The Hon. Secretary announced that Mr. H. L. White (Fellow), who left England a short time ago for New Zealand, had recently been appointed Professor of Architecture and Building at Canterbury College, New Zealand. A paper was read by Mr. H. W. Chatters, F.R.I.B.A., entitled "A Century's Review of English Elementary Schools," which dealt in an interesting and exhaustive manner with the evolution of school buildings from the earliest forms down to the most modern types, and comparisons were made with the schools of Germany and other countries. Mr. Chatters's paper produced an interesting discussion, in which several members took part, and a hearty vote of thanks was passed to him for the trouble he had gone to in preparing his paper.

EDINBURGH ARCHITECTURAL ASSOCIATION.—A meeting of the Edinburgh Architectural Association was held on the 27th ult., in the Association's Rooms, George-street, Mr. Hippolyte J. Blanc, R.S.A., the President, in the chair.—On the motion of the President, Mr. Colin B. Cownie, the Hon. Secretary, was elected a life member without payment in recognition of his services to the Association.—Dr. Gilbert J. Fowler, Manchester, thereafter delivered an address on "Some Principles Underlying the Design of Small Sewage Installations." Dr. Fowler dealt with the purely scientific facts concerned with the processes of purification, and afterwards indicated the application of a knowledge of these facts to actual practice.

Discussing the conditions which designs of sewage installation must conform to if they are to be successful, he dealt with tank construction. Considering the capacity in relation to flow, he said it appeared safe to conclude that the sewage of each person diluted to twenty gallons per head should receive sixteen hours' tank treatment. As to the problem in connexion with tank construction of irregularities in flow, Dr. Fowler mentioned some special features that had been embodied in works carried out for the Admiralty at Shotley, near Harwich. To cope with the fluctuations in population the tanks were constructed in sections, each large section being capable of dealing with the sewage from 600 people, and when the population dropped in holiday-time to about 100, an arrangement was made whereby the exit chamber of one of the tanks could be used separately, the larger tank being flushed out with clean water. Dealing with bacteria beds, he explained the construction and working of contact beds and continuous filters, and said that in a complete installation of contact beds no bed should be of a size greater than would allow of its being filled and emptied within a period during which aerobic conditions were maintained. As a rule, this should not exceed four hours. Frost, he said, was less likely to be feared with contact beds than with continuous filters. His experience in regard to continuous filters and mechanism generally in relation to frost led to the conclusion that the essential condition to be observed was to keep the sewage always moving. He believed it was becoming more and more recognised that the successful dealing with the problems in connexion with that subject would be achieved by the cordial co-operation of the chemist and bacteriologist on the one hand, and with the architect and engineer on the other. Such collaboration was likely to be profitable to all parties concerned, not only those who were called upon to design and carry out works, but also those for whom they were provided.—Dr. Fowler was thanked for his address, which was illustrated by a large number of lantern slides.—The President afterwards showed a series of lantern slides, illustrating the sewage purification installation at Bangour Village, and also the buildings—Mr. Maidman, in seconding a vote of thanks to the President, said that after all the talk there had been as to extravagance at Bangour, he was surprised to find how very simple and efficient the structure seemed.

ABERDEEN ARCHITECTURAL ASSOCIATION ANNUAL MEETING. — The annual business meeting of this Association was held on the 23rd ult., Mr. G. G. Irvine, President, in the chair.—Mr. Arthur Clyne was elected Hon. President, and Mr. James B. Nicol was elected President, in place of Mr. Irvine, who retires. The other office-bearers were elected as follows:—Vice-President, Mr. R. Connon Garden; Secretary and Treasurer, Mr. R. W. Gibbon; members of committee, Messrs. Irvine, Blake, John Aiken, A.R.C.A.; Thomas Paterson, William Green, and H. W. Cruickshank.—Mr. Irvine presided at an "At Home" which followed, and gave an address on the work which had been accomplished during the year. In the course of his remarks he referred especially to the subject of the proposed Technical College, the importance of which, he said, could not be over-estimated. Those of them who had paid any attention to the movements which were taking place in regard to architectural education could not but realise our very backward condition and the absolute inadequacy of the opportunities that were afforded to our students to bring themselves abreast of the very high standard that was now being set. The establishment of a well-equipped technical college would be a very great step forward, though not necessarily a final one. An architect needed that broad and systematic course of training which could only be given by a university. A technical college would be a necessary step in the progress towards that ideal and would be a means of giving effect to it.—The "At Home" was made the occasion for the exhibition of a number of measured drawings and sketches of old work. The contributors included Sir Charles Nicholson, who sent a set of pencil drawings and water-colours, principally of Italian buildings; Mr. J. Cromar Watt, Aberdeen; Mr. William Pyper; Mr. F. W. Troup, London; Mr. Colin J. Macdonald, London, and formerly of Aberdeen, and the late Charles Carmichael.

Books.

The Workmen's Compensation Act, 1906, *with Notes*. By W. ADDINGTON WILLIS, LL.B. (London), of the Inner Temple, Barrister-at-Law. Ninth Edition. (London: Butterworth & Co.; Shaw & Sons. 1907.)

ALTHOUGH this is the ninth edition of "Willis's Workmen's Compensation Acts," owing to the alteration in the law of Workmen's Compensation which will be effected by the new Workmen's Compensation Act which will come into force on July 1 next, it is practically a new book dealing with fresh subject-matter. The author, in the introduction, states that the Act of 1897 affected some 6,000,000 workpeople, and that double this number will be entitled to compensation under the law as extended. This little volume forms a complete guide to the law of compensation offered at an extraordinarily reasonable price, and we have every reason to believe that the author's hopes that it "will merit the same amount of approval and support" that has been extended to former editions will be fulfilled. The text of the statute is printed in its proper order, the notes to each section are clear and concise, and there is a good index. We are inclined to think that the author in his introduction takes rather too hopeful a view of the Act when he states: "It will sweep away the incongruities created by the original statute by extending its benefits to nearly every kind of employment." Indeed, we think no more trenchant criticism could be given of the draughtsmanship of the new Act and the problems it will raise than the fact that an author of the experience of Mr. Willis in matters relating to conpensation finds himself wholly unable to lay down what classes of casual employees will be within the Act. Dealing with the important provision in the Act relating to casual labour, Mr. Willis admits, at p. 106, that "its full effect is not easy to gauge, and it will require much working out," dismissing the subject in eleven lines. The process of "working out" means—as was the case in the original Act—that private litigants are compelled to construe by the aid of the courts matters which the Legislature has left in a condition of complete obscurity.

Laxton's Builders' Price Book for 1907. Originally compiled by WILLIAM LAXTON. Ninetieth Edition. (London: Printed and published by Kelly's Directories, Ltd., 182, 183, and 184, High Holborn, W.C.)

THE stagnation from which the building trade has suffered for the past few years unfortunately shows no sign of coming to an end, at least, so far as the south of England is concerned—and it is the south of England to which those price books which are generally looked upon as standard works principally apply. Yet there is no indication of any downward tendency in the prices of materials generally. Manufacturers complain of the state of trade, and yet the prices obtained during the boom of a few years ago are still maintained. The production of an annual price book seems, therefore, almost superfluous, that for the present year being almost a literal reprint of that for 1906, while that for 1906 bore the same relation to that of 1905. Nevertheless, year by year, one looks forward to these volumes, and in the case of the one under notice it is only fair to say that it fully maintains its position as a standard work of reference, and that its increase in usefulness is in even greater ratio than the increase in bulk which has been the feature of the past few years. We have examined many of the 73,000 prices (we take the editor's estimate of the number) and find them generally to be a fair average for good work, while the miscellaneous information which now seems a recognised feature of these works will be found useful, especially the reports of law cases, which have been brought up to date, and also a reprint of the London Building Acts Amendment Act, 1905.

The Encyclopædia of Practical Engineering and Allied Trades. Edited by JOSEPH G. HORNER, A.M.I.Mech.E. Vol. V. (London: Virtue & Co.)

COMMENCING with "Files," and ending with "Indicating," this volume of the new encyclopædia is largely occupied with such apparatus as machine tools, engines, and cranes of various kinds suggested by letters of the alphabet between F and I, in addition to a very large number of paragraphs dealing more or less fully with subjects on which a little information is often useful. In the present notice we confine attention to a few of the articles devoted to matters coming more particularly within the province of our readers. The word "fire" has suggested paragraphs and articles on firebricks, fireclay, fire-engines, and fireproof structures. Although the inaccurate term "fireproof" is used, the author recognises the fact that "An absolutely fireproof structure may be regarded as impossible." He is quite right in giving brick, concrete, and plaster as the best fire-resisting materials, and reinforced concrete as the next best to brickwork used alone. Some references are made to floors under the heading of "Fireproof Structures," and details of timber floors are included in a succeeding article. Foundations are not treated in a manner likely to be of general interest, as the remarks on this important subject are limited to the foundations of bridges and the difficulties occasioned by river floods. Gas and heat have suggested two useful series of articles, although it does not seem to have occurred to the author that the heating of buildings is an important branch of practical engineering. The defect is partly remedied by a weak and far from comprehensive article entitled "Hot-water Systems." This article contains no mention of hot-water supplies, which certainly come under the heading selected.

In branches of the mechanical arts with which the editor is quite at home, there is very little room for criticism, the descriptive matter being clear, and the illustrations excellent.

Journal of the British Fire Prevention Committee: Record of the Special Commission to the International Fire Service Congress at Milan. (London: Offices of the Committee. 1907.)

ONE of the most important functions connected with the exhibition held at Milan last year was the Congress conducted under the auspices of the International Fire Service Council. Having been invited to send representatives to the Congress, the British Fire Prevention Committee appointed a deputation whose objects were to attend the meetings, and at the same time to obtain information concerning the fire preventive measures and fire service organisations of the chief Italian cities as well as those adopted in a few cities in Switzerland and Germany in the route between England and Italy. On the return of the deputation it was thought desirable by the executive committee of the organisation that some of the information obtained should be published. The result is an illustrated pamphlet.* compiled from the rough notes taken by members of the deputation, recording some facts which are of public interest and various details of personal and domestic character that might very well have been omitted.

In the chief Italian cities, the public authorities appear to take great interest in the subject of fire prevention. Questions of fire protection connected with structural considerations are dealt with by the superior officers of the various fire brigades, which are generally under the direction of military officers, civil engineers, or architects. Owing to the substantial character of domestic and business premises, and the comparatively limited extent to which artificial heat and light are employed, outbreaks of fire are less frequent in Italy than in Northern Europe, notwithstanding the fact that the materials of illumination are of hazardous nature, and electric lighting cables and wires are very imperfectly insulated. Fire-resisting construction is not well represented by the industrial works of the cities visited by the deputation, and the small number of large

* Journal of the British Fire Prevention Committee, February, 1907.

fires in such establishments is attributed chiefly to the order and cleanliness generally prevailing, and to the excellent private fire brigades and fire protective appliances with which they are almost invariably provided.

Notwithstanding the admirable organisation of the Italian Fire Service Federation, the equipment is somewhat antiquated as a general rule, although in various cities signs are to be found of readiness to adopt apparatus of the most modern types. As examples, we may mention the motor-van of the Bologna brigade, the motor chemical engine of the Milan brigade, and the motor launches of the Venice brigade. The salvage van used at Florence is specially recommended as worthy of general adoption. This being so, it is unfortunate that no detailed description of the appliance is given in the report.

Fire prevention in Switzerland is looked after by an organisation of a kind which the people of Great Britain are not yet prepared to accept.

The fire brigade is constituted on military lines, all males except those who are exempt by reason of age or health, and others who occupy certain specified positions, being compelled to render service, and, in addition to their duty as firemen, the corps perform police duties during fires and attend to the work of salvage. An exception to the general rule is to be found at Bâle, where the brigade includes what may be termed a small regular army for dealing with small fires, and the reserves who are called up in case extensive fires break out.

The excellence of building regulations, the careful and regular supervision of possible causes of fire, and a fairly average quality of building construction account for the comparative infrequency of fires in the chief cities and towns of Switzerland,

An appliance deserving special attention is the van used by the Technical Section of the fire brigade at Lucerne, a vehicle in which are carried tool chests equipped with all requisites for dealing with troubles in gas supply, electricity, telephone, and tramway systems. Plans of the various mains are carried in the vehicle, which is manned by artisans skilled in the different trades concerned. This feature of the Swiss services is one that quite deserves imitation, so far as we can judge from the meagre particulars given of it in the report.

Only two German cities were visited by the members of the British Fire Prevention Committee, and these do not furnish object lessons likely to be of service in Great Britain.

Although it contains some general particulars concerning the organisation and equipment of a few fire brigades, and jottings on various matters more or less relevant to the business of the deputation, and serves to convey the impression that the members must have had a very pleasant outing in the course of which they saw many interesting things, the record to which we refer will probably be received with disappointment by those who expect to find in it a fully detailed and business-like technical report.

The Modern Plumber and Sanitary Engineer. Edited by G. LISTER SUTCLIFFE, A.R.I.B.A., M.R.S.I. (London: The Gresham Publishing Company. 1907.)

THE book is the first volume, and is divided into three sections.

Section I. is an introduction by the editor consisting of six chapters, and deals with the chemical and physical properties of the metals and various materials used by a plumber, their manufacture and market forms, etc., comprising a very interesting collection of useful information. One or two of the illustrations will require the text referring to them to be corrected. For example, page 12, line 4 from top of page, "No. 1 Plate IV." evidently refers to No. 2 Plate III., while on page 11 No. 2 Plate III. is referred to as showing the manufacture of soil and rain water pipes.

Section II., "The Elements of Practical Plumbing," by James Gammie, a teacher of plumbing under the City and Guilds of London Institute, etc.: Chapter I. contains a very good description of the various tools required by plumbers and their uses, most of which are very well illustrated. Unfortunately, the illustrations in the following chapters of this section are not as accurate as they should be, except perhaps the photographic reproductions. We must, however, call attention to one of these, in which a man is shown wiping a small branch joint by the aid of an iron. We wonder how many good plumbers would require this assistance? Copper bit joints are not suitable for waste pipes, but perhaps their use for fixing small brass unions to lead pipes might be permissible.

There is also some lack of consistency between the illustrations and the text. For instance, Fig. 41.—Cesspool partly worked (bossed); Fig. 42.—Cesspool in position showing a solder angle). We are not opposed to solder angles, but, when instructing the uninitiated, one method should not be confused with another. Fig. 56.—Soldered Dot, is more like Fig. 57, No. 2. Now, Fig. 126 shows a dot as it should be. A comparison of the two will be instructive.

The following description is merely a typical example of the lack of precision which pervades a large proportion of this section, indicating lack of practical experience:—"A cap and lining is screwed to the fitting and wiped on to the lead pipe." Why could not the words "after being" have been used instead of "and," and the word "trap" used instead of "pipe"?

Page 93, "Fixing marble tops to basins." There is no mention of the actual "fixing"; it simply describes the pointing of the joint between the basin and the marble.

The writer evidently feels more at home with the ornamental lead work, which forms an interesting chapter. Section III. deals principally with sheet-lead work, and, although the previous section covers much of the same ground, the information in this section is more thorough, and bears the hall-mark of a practical man. In a future edition it would be much improved if the work covered by this section were eliminated from Section II.

Plate VIII. and its description are probably insertions by the Editor, portions of which are not consistent with previous descriptions of the work in the same chapter.

The illustrations in this section are very clear, show exactly what is required, and are well drawn, except perhaps Fig. 170.

It is to be hoped that future volumes will be as practical and well illustrated as Section III. in this volume; they will then be valuable additions to the student's library.

The proposed scope of the complete work is far beyond what would be included in the work of the modern plumber. Ventilation, heating, electric lighting, etc., are trades by themselves, and as such require persistent and constant study and experience to be proficient in them.

The Clay-worker's Handbook. By the Author of "The Chemistry of Clay-working." (London: Charles Griffin & Co., Ltd., 1906.)

THIS is an excellent book for the use of those commencing to study clay-working and pottery manufacture, but the information it contains is, for the most part, of a very general character, and experienced clay-workers will probably fail to find much instructive matter in it. The book contains chapters on the materials used in clay-working, on the preparation of clay, on machinery for clay-working, and on the drying, glazing, and firing of clay. The section on "Tests, Analysis, and Control" is good, and contains some useful notes on the measurement of high temperatures.

To ascertain whether "efflorescence" is likely to appear on any particular description of brick, the following test is recommended:—Support the brick to be tested on two horizontal glass rods over a shallow (photographic) dish, and on top of the brick place, upside down, a bottle full of distilled, or rain, water. If this is carefully done, the brick will slowly absorb all the water from the bottle, and yet will not allow any of it to "run away." The soluble salts contained in the brick will be dissolved by the water, carried to the surfaces of the brick, and deposited there as a white scum when the brick dries. This test, says the author, is a very delicate one, and will produce scums with quantities of salts so small that they would not be detrimental in actual practice. The appearance of slight traces of scum on the brick may be neglected, and only those bricks which show a marked deposit need be condemned.

We think that the book might with advantage have been condensed by the omission of several verbose paragraphs which convey very little information or instruction. The last paragraph on page 226 may be quoted as an example of matter which might have been omitted. Even a lad fresh from school knows that tools should not be left lying about to rot and rust, and the use of nine lines of letterpress to state this precept is, in our opinion, unnecessary.

Memorials of Old Kent. Edited by P. H. DITCHFIELD and GEORGE CLINCH. (London: Bemrose & Sons. 1907.)

LIKE all series, these various volumes of "Old Memorials of English Counties" differ widely in the value of their contents. They are all well printed and tastefully brought out, but the letterpress and illustrations differ widely, and remind us of Martial's own summary of his epigrams. Of these he said that some were good, some were bad, and the majority moderate. Adopting this division, the Kent volume may be certainly classified amongst the good; indeed, it strikes us as being the best of those hitherto issued. There are two or three genuine additions to the architectural history of thecounty. Mr. J. Tavenor-Perry writes well on XVIIth century church architecture in Kent, a period which the great majority of ecclesiologists seem determined to ignore. But, although the amount of new churches, or the repairs and additions to old ones, were but small during the Stuart and Commonwealth periods and the advent of William of Orange as compared with the previous epochs, nevertheless England and her Church were alive during that century. Directly a particular county is taken in hand, it becomes evident that the work at church fabrics was by no means inconsiderable, and, further, that that which the revived Gothic mania has left standing is well worth studying. Thus at Halsted, in 1619, the tower and most of the church were re-erected, only to make way for a commonplace imitation of XIIIth century style during recent years. In 1624, the large church of St. Nicholas, Rochester, being in ruins, was entirely reconstructed; but most of this interesting work has, unfortunately, been recast and spoilt. The chapel of Groombridge was rebuilt in 1621, and the nave and tower of Charlton Church, as they now stand, were completed in 1640. At Plaxtole, in the wide parish of Wrotham, a large and important church was completed on the eve of the Commonwealth struggle; the idea, it is said, originated with Archbishop Laud. The tower and nave of St. Leonard's, Deal, were rebuilt in 1684. In addition to these important works, there were various additions to existing buildings, such as the porches of Ashurst, Chiddingstone, and Hucking. The first of these is of 1621, and bears the arms of Sir John Rivers and a sundial. Chiddingstone porch, 1626, is a work of distinct value, and has been described in Bloxam's "Ecclesiastical Architecture." As for church fittings, although at least one XVIIth century chancel screen and the fine 1619 gallery at Ightham have been pulled out, there are some interesting fenders at Charing, as well as numerous pulpits and font-covers.

An excellent article, by Mr. Aymer Vallance, deals with the mediæval rood-lofts and screens of Kent. This essay, which covers over sixty pages, contains much valuable information of a general character as to the erection of roods and rood-lofts, and as to their general demolition in the XVIth century; but its chief value consists in some very good photographic plates from Mr. Vallance's camera, with careful descriptions of several beautiful examples of still extant chancel screens. Mr. James Richardson, of North Berwick, supplies measured drawings of the screens of Shoreham and Tong.

Space forbids our doing more than saying of the rest of the volume that it is replete with good and original articles—on old Canterbury, on various castles and famous manor-houses, as well as accounts of striking historical incidents. In short, it may be described as good from beginning to end.

The Brasses of England. By HERBERT W. MACKLIN. (London: Methuen & Co. 1907.) HAINES'S "Manual of Monumental Brasses," published in two volumes in 1861, was the first general work of importance on English monumental brasses, although a variety of fairly good expensive monographs on particular counties had been previously issued. In 1890 Mr. Macklin himself brought out a useful elementary manual on monumental brasses, whilst in 1906 a good work by Mr. Druitt dealt with the costume side of the question. There was, however, abundant room for such a volume as Mr. Macklin has now produced in Dr. Cox's series of "Antiquary's Books." The volume is comprehensive, scholarly, and particularly well arranged. There is not a footnote from beginning to end, but abundant references are given in the text, whilst an admirable series of brief appendices follow the chapter to which they refer, instead of being crowded together at the end in smaller type (as is the usual practice), a method that insures them being very seldom read or consulted. Thus, Chapter II., which deals with brasses in the reigns of the first two Edwards, gives an account of the first twenty monumental brasses extant in England; and this is followed by four concise but excellent appendices on the engravers, the enamellers, inscriptions, and the beginning of English heraldry.

Chapter IV. has for its subject "Architectural Ornament"; it is particularly praiseworthy for its clearness and technical accuracy. We are not aware that any other book dealing with brasses has pointed out that some of the best canopies and ornaments found in brasses of the XIVth century are intended to follow the recumbent idea of the earlier stone effigy, where a similar arrangement is found, a low canopy of stone, sometimes only a few inches above the level of the slab, surrounding the sculptured effigy. Each variety of subsequent brass canopy is carefully discussed. Brackets and different forms of crosses are also adequately treated. The illustrations, which number eighty-five, are well selected and admirably executed.

BOOK RECEIVED.

AYLESBURY AND ITS SURROUNDINGS. (The Homeland Association. 1s.)

The Student's Column.

ELECTRIC LIGHTING AND HEATING.—XII.

Rotating Magnetic Fields — Three-phase Alternator—Star and Mesh Voltages—Measurement of Three-phase Power—Two-phase Machines.

ROTATING MAGNETIC FIELDS.—In an ordinary direct-current dynamo it is immaterial whether we design the machine so that the armature rotates and the field magnets are stationary, or so that the field magnets rotate and the armature is stationary, as the electrical action of the machine is practically the same in each case. When the field magnets rotate we get a rotating magnetic field, the direction of the magnetic force at any point continually revolving. Similarly with alternating current machines, when the field magnets rotate they produce rotating magnetic fields. When alternating current magnets, however, are available, these fields can be produced without the necessity of moving the magnets.

If the core of an electromagnet be built up of thin strips of soft iron, insulated from one another by means of shellac varnish, it may be used with alternating currents. It is necessary to laminate the core in this case, as otherwise it will heat excessively owing to the eddy currents generated in it. When the windings of such a magnet are supplied with alternating current, the polarity of the ends of the magnet alternates with the same frequency as the current, and so the strength of the magnetic field at all points in the neighbourhood of the magnet continually varies.

Let us now suppose that two magnets excited by alternating currents of the same frequency be placed with their axes at right angles and pointing in the directions AOA^1 and BOB^1 (Fig. 17) respectively. Let us also suppose

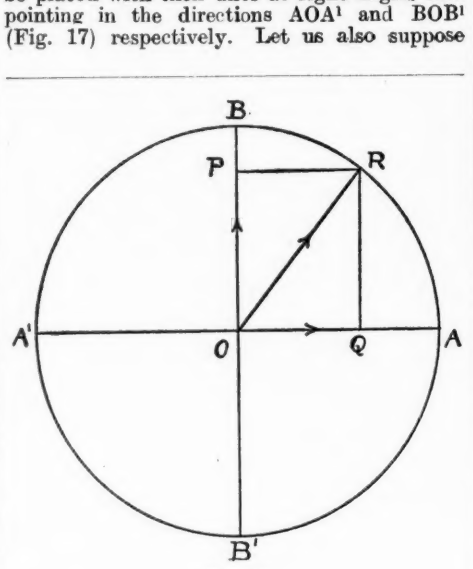


Fig. 17.

that OA is the maximum intensity of the field at O, due to one of the currents, and OB, which we suppose equal to OA, is the maximum intensity due to the other. If the currents are in step with one another, the components OP and OQ will be equal, and thus the resultant magnetic force at O will bisect the angle between OA and OB, and will therefore be fixed in direction. In this case the resultant field oscillates in a fixed direction, going through all its values during a period of the alternating current.

When the alternating currents exciting the magnets are not in step with one another, the resultant field at O changes, not only in direction, but also in magnitude, during the period. The extremity of the line representing the resultant magnetic force during a period in general traces out an ellipse with O as centre. In the particular case when the two exciting alternating currents are in quadrature—that is, when their phase relations are such that one has its maximum value when the other is zero and *vice versâ*—the extremity of the magnetic vector R (Fig. 17) traces out a circle. In this case a pure rotating magnetic field is said to be produced, the magnitude of the resultant magnetic field being constant, but its direction rotates with constant angular velocity.

A study of the properties of rotating magnetic fields is necessary in order to understand the action of many types of alternating current machines. If we place a pivoted magnetic needle in a rotating field it will spin round with the same speed as the field, making a complete revolution in the period of the alternating current. If, for instance, the frequency of the alternating current be fifty, the needle will make fifty revolutions per second. When a copper sphere resting on a smooth plate is held in a rotating field, it spins round with an angular velocity nearly equal to that of the field. This is owing to the reaction between the eddy currents induced in the metal and the rotating magnetic forces. It will be seen that mechanical rotation can be produced, and so the motor problem can be solved in a very simple manner with alternating currents, provided that we can get alternating currents which are not in step with one another. This, however, cannot be done easily with ordinary alternators, and so a new class of machinery has sprung up designed specially to produce alternating currents which are not in phase with one another. These currents can be utilised to work a very efficient class of motor, and thus mechanical energy can be transmitted considerable distances by means of these currents. This special class of machinery is called polyphase machinery. We shall now consider the two practical types of polyphase alternator, namely, the three-phase and the two-phase alternator. In contradistinction to these machines, the ordinary alternator is referred to as a single-phase machine.

Three-phase Alternator.—The fundamental principle of the commonest type of three-phase alternator is shown in Fig. 18. Insulated wire is wound evenly round a laminated iron ring, and the terminals of the machine are connected with three points on the winding which are at an angular distance apart of 120 deg. A powerful electro-magnet NS rotates inside this ring, and as the magnetic

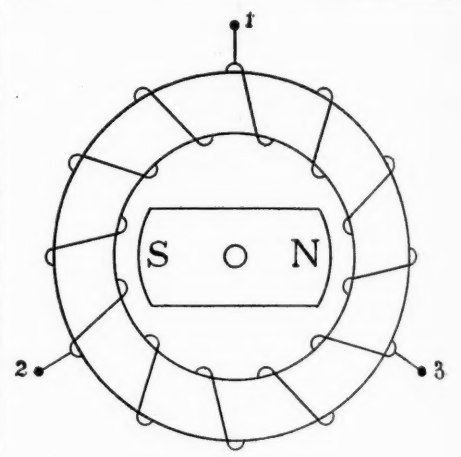


Fig. 18.

circuit is completed through the halves of the ring, the flux in a coil joining any of the two terminals will reverse every half revolution. We see, therefore, that an E.M.F. will be set up in each coil, the frequency of which equals the number of revolutions per second made by the magnet.

The mains are connected with the three terminals of the machine (Fig. 18), and the load may be connected in star (Fig. 20), or in mesh (Fig. 21), between the three mains. From the symmetry of the windings of the armature, it follows that the maximum value of the potential difference between any pair of the alternator terminals must be the same. The maximum values, however, will not all occur at the same instant, and there will be a time lag of one-third of a period between any pair of them. The phases of the currents that will flow in resistances connecting 1 with 2, 2 with 3, and 3 with 1 will all be different, and it is easy to obtain a rotating field by their use. For instance, if we have a second alternator similar to that shown in Fig. 18, and if the terminals of the machines be connected by conductors, then when either machine works as an alternator the other will rotate as a motor, as the currents flowing in its armature windings will set up a rotating magnetic field which will constrain the field magnet to move in step with it.

A conventional method of showing the windings in a three-phase armature is illustrated in Fig. 19. The upper portion of the

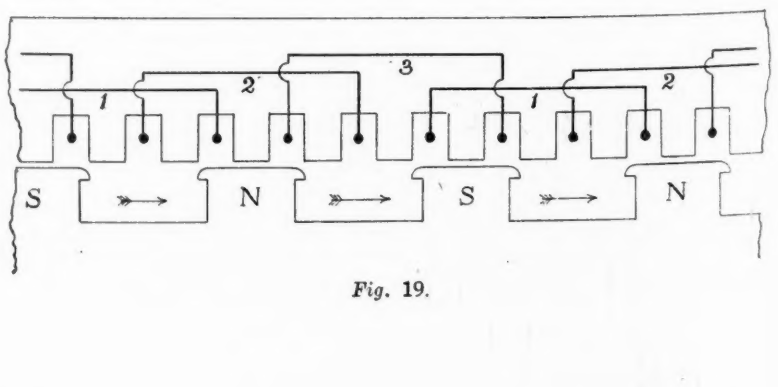


Fig. 19.

figure represents the armature, which is built up of iron stampings insulated from one another. The armature conductors are supposed to be at right angles to the plane of the paper, and are represented by dots, the end connexions 1, 2, and 3 of the armature conductors only being shown. In modern machines the armature coils are former-wound—that is, they are wound into shape on a rectangular wooden block before being fixed on the stator. The conductors lie in slots on the armature, which are parallel to the axis of rotation of the rotor. In Fig. 19 it will be seen that there are three slots per pole, or, as engineers are in the habit of expressing it, one slot per pole and per phase. A study of this figure will show that the E.M.F.'s, developed in the windings marked 1, are all in the same phase, and thus they add in series round the armature. Similarly, the E.M.F.'s developed in the windings 2 will be in phase, but they will differ by a third of a period from those developed in 1 or in 3.

In Fig. 19 we have drawn the stator and rotor as if they were flat, but, in reality, the rotor forms part of a large revolving cylindrical wheel, and the stator forms part of a stationary cylinder surrounding it. In three-phase machines, there are three windings on the armature, and there are consequently six ends to these windings. If the windings are connected "in star," three of these ends are connected together, and the other three are the three terminals. For instance, in Fig. 20, O is the common connexion of the

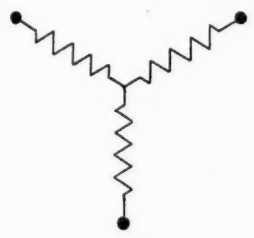


Fig. 20.

three windings (the neutral point), and 1, 2, and 3 are the terminals. When the windings are connected "in mesh" (Fig. 21), each of the three terminals is connected with two of the windings.

Star and Mesh Voltages.—When the rotor is turning at the speed for which it has been designed, and the field is excited, the voltage between the terminals of the machine, and therefore also the voltage between the mains, will depend on whether the armature windings have been connected in star or in mesh. If V be the effective value of the voltage generated in each of the mesh windings (Fig. 21), the voltage between any pair

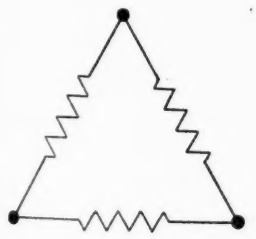


Fig. 21.

of mains is V also. When, however, the windings are connected in star (Fig. 20), the voltage between the mains 1 and 2 will be the resultant of the voltage V from 1 to the neutral point, and of the voltage—V from the neutral point to 2. Hence, it will be the same as the resultant of two voltages equal to V, and the phase difference between which is 60 deg. Remembering that the vectors representing voltages can be compounded according to the parallelogram law, we see that the magnitude of the resultant voltage between the mains in this case is $V\sqrt{3}$, or 1·732V approximately. Hence, if the armature be connected in star the voltage is about 73 per cent. higher than when it is connected in mesh.

Measurement of Three-phase Power.—The measurement of power in three-phase circuits is done in exactly the same way as in three-wire direct-current systems. Two wattmeters are required (Fig. 22). The ampere

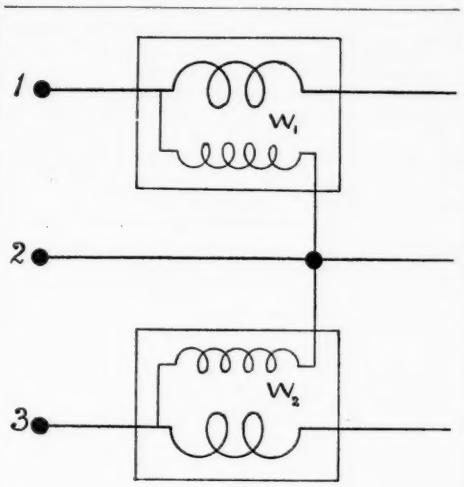


Fig. 22.

coil of one wattmeter is put in series with No. 1 main, and its volt coil is connected between No. 1 and No. 2. Similarly the ampere coil of the second wattmeter is put in series with No. 3 main, and its volt coil is connected between No. 3 and No. 2. If W_1 and W_2 be the two readings, the total power expended will be $W_1 + W_2$. This is generally referred to as the "two-wattmeter method" of measuring power in three-phase circuits.

Two-phase Machines. — In three-phase systems of distribution we have three mains joining the station where power is generated to the station where it is distributed. Each main carries alternating current, the phase difference between the currents being one-third of a period. Similarly, in a two-phase system we have four mains joining the two stations, the mains carrying currents which differ in phase by the quarter of a period. Strictly speaking, the ordinary single-phase system should be called the two-phase system, the currents in the two mains always being equal in magnitude but flowing in opposite directions, and we have thus always two currents differing in phase by half a period. For the same reason the two-phase system should be called the four-phase system in order to avoid ambiguity. In America it is genarally referred to as the quarter-phase system, but, as it is inadvisable to use the phrase third-phase system, this custom is not to be commended.

Part of a simple "bar winding" for a two-phase machine is shown in Fig. 23. We may suppose that the field magnets form the rotor, and we can imagine them slipping underneath the fixed armature windings shown in the figure. It will be seen that the E.M.F.'s generated in the windings 1 and 2 will differ in phase by the quarter of a period. The windings 3 and 4 will be placed

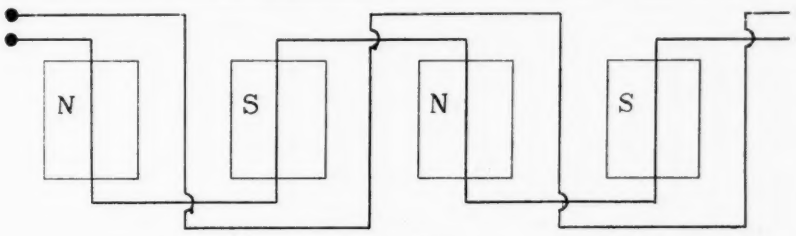


Fig. 23.

in the same slots of the armature as the windings 1 and 2, for by considering the other ends of these windings as the ends from which the phase of the E.M.F.'s are determined, we see that they will differ in phase by 180 deg. from the E.M.F.'s generated in 1 and 2.

If V be the effective voltage generated in each of the four windings of the armature, and A be the current flowing in each when the machine is symmetrically loaded, the maximum output is 4VA, whether the coils be connected in star or in mesh. When the coils are connected in star the effective voltage between adjacent mains is $\sqrt{2}$V, and the currents in the mains are each equal to A. When the coils are mesh connected, the effective voltage between the mains is V, but the currents in the mains are now $\sqrt{2}$A. The maximum output which, as in the case of a three-phase machine, is determined by the maximum permissible heating of the armature, is the same whether the machine be connected in star or in mesh; but in the former case the voltage between the mains is 41 per cent. greater than in the latter, and the current is proportionally smaller. Hence, for power transmission, it would be better to connect the armature in star than in mesh, as the mains required would be cheaper.

ELECTRIC LIGHTING AND HEATING.—XIII.

Electric Motors—Theory of the Motor—The Torque—Types of Motor—Open and Enclosed Type Motors—Starting Resistances.

ELECTRIC MOTORS.—In the preceding chapters we have considered the methods of generating the direct, alternating, and polyphase currents which are used in the electrical distribution of energy. In the present chapter we shall consider the motors which are employed to reconvert the electrical power into mechanical or into another form of electrical power. Every motor has two main parts—an armature, taking current from the mains and driving some type of machine either directly or by means of a belt, and a system of field magnets which produce the intense magnetic field in which it is necessary that the armature rotate. We shall call the rotating part of the motor, which in direct current machines is generally the armature, the rotor, and the stationary part the stator.

The principle of the electric motor is that when a wire carrying a current is placed in a magnetic field and at right angles to the lines of force in the field it experiences a force tending to move it at right angles to the field. The magnitude of this force is proportional to the length of the conductor, the strength of the field, and the magnitude of the current. The direction in which this force acts can easily be remembered by Dr. Fleming's left-hand rule:—If the thumb and the first and second fingers of the left hand be held mutually at right angles, and if the first finger point in the direction of the field and the second in the direction of the current in the wire, then the thumb will point in the direction of the force acting on the wire.

The action of a motor the armature of which consists of an iron ring wound uniformly with insulated wire can be readily understood from the diagram shown in Fig. 24. By means of a commutator on which metal or carbon brushes press (not shown in the figure) the current always enters the armature windings at the top of the ring, and, after splitting into two, re-combines when leaving at the lower part of the ring. The effect is to make the ring a powerful magnet having its north pole uppermost. There will thus be a strong attraction between the north and south poles of the fixed and movable magnets, and a strong repulsion between their like poles. Hence the ring will rotate in the direction of the arrow-head.

Theory of the Motor.—We shall suppose that the resistance of the armature windings

measured between the brushes is R, and that the voltage applied to the brushes is E. We shall also, in order to simplify the theory, suppose that the field magnets are excited by accumulators. If the armature be prevented from rotating, the current C entering at the brushes will be given by C = E/R. If, however, the armature rotate, a counter E.M.F. "e" will be set up, owing to the armature conductors cutting lines of force. Hence the equation will now be

$$C = (E - e)R.$$

The electric power expended by the current C in the armature may be divided into two parts, C^2R, expended in heating the windings, and Ce, converted into mechanical power P. Hence

$$P = Ce = e(E - e)/R.$$
$$= [E^2/4 - (E/2 - e)^2]/R.$$

Now this is a maximum when e = E/2, as the term to be subtracted inside the bracket is then zero. The efficiency of the conversion is the ratio of the useful power to the total power—that is, Ce/CE = e/E. When the power given to the motor is a maximum we see that the efficiency is only one-half, or 50 per cent.

In practice a motor must not be run at a load near its maximum, for this would leave it very little margin of power to overcome any of the fluctuations of the load which are always occurring in practice. It is customary to design the motor so that when running at its normal full load the twisting couple, or torque as engineers call it, is only about a quarter of the maximum torque that the motor can give. When the motor is running at no load its velocity is a maximum, and e is very nearly equal to E. As the load increases the speed diminishes. If the resistance R be so high that there is no risk of burning out the armature, then when the speed is nearly half the speed on no load the power exerted is a maximum, and any increase of the load will cause the machine to pull up. The efficiency of a good ten horse-power motor is often greater than 80 per cent. at full load, and the difference in speed between no load

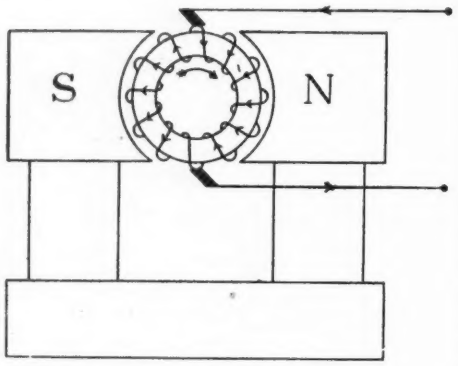


Fig. 24.

and full load is sometimes less than 5 per cent.

The Torque.—If T denote the torque—that is, the mechanical couple tending to produce rotation of the armature—and if it be measured in foot pounds, the amount of work done per second is $2\pi n T$ ft. lb. where n is the number of revolutions of the armature per second. Hence, remembering that 1 ft. lb. per second equals 1·356 watts, we get

$$2\pi nT \times 1{\cdot}356 = Ce,$$

and, therefore,

$$n T = 0{\cdot}1174Ce.$$
$$= 0{\cdot}1174C(E - CR).$$

If, for instance, we have a motor for which R = 0·2 ohm, and if it is taking 10 amperes at 200 volts, and if the armature is making 800 revolutions per minute, we have

$$800T = 0{\cdot}1174 \times 10(200 - 2),$$

and, therefore,

$$T = 0{\cdot}29 \text{ ft. lb. nearly.}$$

Types of Motor.—Direct-current motors may be divided into three main classes depending on the windings of the field magnets. They are called series, shunt, and compound machines respectively. In a series machine the field magnet windings are in series with the armature windings so that at every instant the current in them is the same. At the start we have the maximum current, and consequently the maximum magnetisation of the field magnets. Since the torque is directly proportional to the product of the current and the magnetic field, it will also be a maximum at the start. As the armature gets up speed a counter E.M.F. will be generated in accordance with Lenz's law, and so the current and magnetisation will diminish. This type of motor is a variable speed motor—that is, it runs at different speeds at different loads, and consequently it is not of such general use as the shunt motor, which runs at practically constant speed at all loads.

In the shunt motor the field magnet windings are in parallel with the armature, and if the applied voltage be maintained constant at all loads, the magnetisation of the field will also be constant. At light loads the current taken by the armature is very small, and as the load increases the current taken by the armature increases. In many shunt machines the current taken is very approximately proportional to the load, and the speed is practically constant. In some machines the armature reaction distorts the magnetic field, and there is excessive sparking at the brushes at full load. To get over this difficulty the brushes are moved backwards on the commutator to the position where the sparking is a minimum. But in this position the axis of the magnet, which is equivalent to the armature, is no longer pointing vertical, and the currents in the armature coils have a demagnetising effect on the field magnets. Hence, the magnetic field in which the armature rotates is weakened, the back E.M.F. generated is therefore smaller, and the speed of the machine quickens so as to increase this back E.M.F. and prevent an excessive current from flowing in the armature. The distortion of the magnetic field by the currents in the armature when the line joining the brushes (Fig. 24) is vertical, and the demagnetising or magnetising of the field magnets, depending on whether a backward or forward lead be given to the brushes, are effects which are due to what engineers call "armature reaction."

In the compound motor we have two windings on the field magnets, one in series with the armature, and the other as a shunt across it. When working, therefore, it combines the characteristics of a shunt and series machine. It starts with a powerful torque, and when the load is varying rapidly, the machine runs steadily, provided that the relative number of series and shunt windings has been properly chosen. In the motors used for lifts the series turns are generally about a tenth of the shunt turns. In many cases the speed is practically constant at all the working loads. This type of motor is usually employed for working lifts and hoists, and also for printing presses.

Open and Enclosed Type Motors.—When a motor has to work in a dry and clean situation, and is not liable to get clogged with accumulations of dust, etc., it may be of the open type. When, however, it has to work in places where it gets rough usage, the motor is entirely enclosed by the framework supporting the bearings, and is said to be of the enclosed type. The latter type of motor is more expensive than the former, not only because of the protective casing, but also because the armature heats more than when rotating in the open air, and thus a larger-sized machine has to be employed. The fire insurance companies insist, in many cases, that only enclosed type moters be employed.

Starting Resistances.—As the resistance of the armature of a motor is very small, care has to be taken that it is not put directly between the mains during the start, as otherwise an excessively large current will flow through it, which, if the main fuse does not "blow" promptly, will seriously damage the machine. For starting motors of appreciable size, special starting and regulating resistances have to be employed. A starting resistance for a shunt motor is illustrated in Fig. 25. When the handle of the switch is turned so that the movable contact piece is on the second contact piece, the shunt windings are put across the mains, and the field magnets are consequently excited. At the next contact current flows from the mains through a resistance and the armature in series, the armature beginning to rotate. As the handle is moved round, the resistance in series with the armature is gradually cut out of circuit, but unless the handle be moved too quickly the current will be small owing

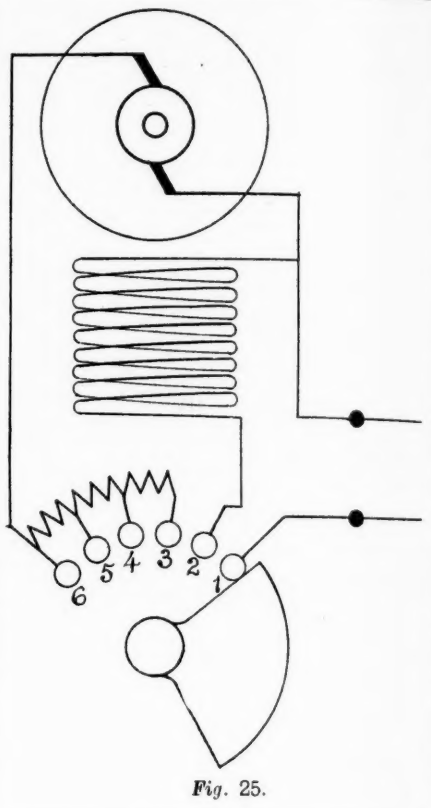


Fig. 25.

to the counter E.M.F. set up by the rotating armature.

The starting resistance coils are generally made of platinoid wire, and are enclosed in fireproof metal boxes. Various devices are employed in practice for automatically starting motors so as to make it impossible for them to be damaged by any carelessness on the part of the attendant.

Illustrations.

WINCHESTER HOUSE: DETAIL ELEVATION.

THIS detail shows a portion of the façade to London-wall, the ground floor being in Cornish granite, and the whole of the upper part in Portland stone.

The drawing represents a piece of the central portion of the façade, consisting of five bays, the side being continued in simpler character to Old Broad-street. The corresponding wing will no doubt eventually be continued to Winchester-street and thus form a symmetrical design.

The floors are on the same level as the old part of Winchester House, and are linked up with it by corridors.

The contractors were Messrs. Trollope & Colls, and the architect is Mr. J. Belcher, A.R.A.

BURROUGH COURT, LEICESTERSHIRE.

THIS is, as will be seen from the title and plan on the drawing, a hunting-lodge with a considerable extent of stables and other subsidiary buildings attached, and with a special treatment of the garden as a part of the general design.

The house is in the quiet and unpretending architectural style which, in a country house of this kind, is often more satisfying than any assumption of architectural style and dignity. Our only criticism is that the desire for a certain uniformity in the arrangement of the windows on the principal front has led to the dining-room having a large south window to match that at the end of the billiard-room on the other side. It would have been better for the dining-room to have had its principal light on the east side.

Mr. W. H. Brierley is the architect.

MUNICIPAL OFFICES, CHELTENHAM.

THIS design, which was exhibited in last year's Royal Academy, was prepared to show the Borough Council of Cheltenham that it was quite possible to adapt the site in St. George's-square for municipal offices, and that the obtuse angle formed by the frontage lines might be used to architectural advantage.

The main entrance to the building is marked by a clock tower placed at the angle of the two frontages, secondary entrances being placed at each end.

The ground floor accommodates the town clerk's, surveyor's, accountant's, and medical officer's departments, and the public rates office, and upon the first floor are the council-chamber, mayor's parlour, councillors' and committee rooms, together with spare rooms and the education department. A basement extends under a portion of the ground floor, and caretaker's-rooms are placed above the first floor offices in the west wing of the building.

The materials proposed to be used are stone and red brick, and the estimated cost exclusive of tower 16,000*l*.

The architects of the building are Messrs. Pearson & Milburn, of London, and Mr. Thomas Malvern, of Cheltenham.

WROUGHT-IRON SCREEN, HAMPTON COURT.

THE beautiful old wrought-iron screens at Hampton Court dividing the Priory Gardens from the river, on the south front of the Palace, are from the designs of the French artist Jean Tijou, the craftsmanship being attributed to Huntingdon Shaw, of Nottingham, who died in 1710. The screens were executed at the same time that Sir Christopher Wren's portion of the Palace was built, in 1690. In 1865 they were removed from their present position, and, after being lent to various museums about the country, were once more brought to Hampton Court, and in the winter of 1901-1902 were re-erected on the old original foundations, which were accidentally discovered on removing the turf when preparing the site.

The drawing is by Mr. Arthur F. E. Poley.

Competitions.

KENDAL NEW PUBLIC LIBRARY.—At a recent meeting of the Town Council Committee, the award was made in the competition for a new public library, in which eleven architects took part. The first award was made to Mr. T. Frederick Pennington, London; Mr. A. N. W. Hodgson, Lincoln, was second; and Mr. C. Pearson Shaw, Nottingham, third. The other competitors were Messrs. Thos. Sharpe, Durham; R. G. Beard, J. F. Curwen, Malcolm Shaw, Stephen Shaw, John Hutton, and W. A. Nelson, Kendal; and T. Moffat Banks, London. By a central entrance in Stricklandgate access is gained by the premiated design to an octagonal hall 19 ft. 6 in. in diameter. Two sides of this octagon are arches, through which a perfect view from the counter of the lending department can be obtained of the principal entrance and the entrances to all the rooms and the staircase to the upper floor, all of which open directly out of this hall. From the same counter a good view can be obtained, through glazed screens, of every room, and to make the supervision more easy the floor of the lending department is raised 1 ft. 6 in. above the surrounding floors. The rooms consist of a reading-room, reference-library, ladies'-room, juveniles'-room, committee-rooms and offices, and no room is a thoroughfare leading to any other room. The rooms will be light, as in no case is there a less area of glass than one-fifth of the floor area, and with top light in addition to windows where such light is desirable, as in the lending-library, so that no faces of the books are in shadow. The south-west archway of the octagonal hall is the entrance to the lending-department. Directly opposite the archway is the inquiry-counter, on the right the receiving-counter where borrowers deliver up their books, and thence, if they desire another, go through a gate, which by a foot-lever is under the control of the attendant, into the book store and return by way of the issue counter on the left where the book is registered. The lending-department will accommodate 34,720 books placed in stacks eight shelves in height, so that all are within easy reach without a ladder. From the lending-library there is direct private access to the reference-room, where 3,240 volumes and twenty-four readers can be accommodated. In the ladies'-room provision is made for thirty-eight readers, the juveniles'-room will accommodate twenty-six, and the reading-room forty-four newspapers and eighty-four readers at seven tables. The heating of the building is to be by low pressure hot water ventilating radiators. Over the lending-library and reading-room are automatic concealed roof ventilators, but in regard to the smaller rooms it is proposed to connect them each with a separate flue to a ventilating shaft surrounding the boiler flue and drive out the vitiated air by an electric fan. The building is to be of local limestone with Prudham dressings.

NEW SCHOOL AT GOUROCK.—A special meeting of the Gourock School Board was held on the 27th ult., at which the assessor of the competitive plans for the proposed new school, Mr. David Barclay, was present. After conferring with the assessor, the Board unanimously resolved to adopt his report, and to award the premiums offered in the competition as follows:—1, 40 guineas, to plan bearing motto "Q.E.D."; 2, 30 guineas, to plan "Avant, Be Watchful"; and 20 guineas to plan "Light." On the envelopes containing the names of these being opened, it was found that the following were the successful competitors:—1, Mr. Alexander Cullen, Brandon Chambers, Hamilton; 2, Messrs. Stewart, Tough, & Alexander, Greenock; and 3, Mr. H. D. Clifford, 225, St. Vincent-street, Glasgow.

Correspondence.

ENDWAY SHRINKAGE OF WOOD.

SIR,—In reply to your correspondent at page 403, all wood shrinks longitudinally as well as transversely, but in a less degree. In some kinds the contraction is, for most purposes, a negligible quantity. Amongst the worst sinners are kauri pine, mahogany, and sequoia. If a board be cut off a log of mahogany it will soon show itself to be perceptibly shorter than the log. African mahogany in this respect requires careful treatment. The remedy is thorough seasoning and drying in the thickness in which the wood is to be worked.

ARTHUR HARSTON.

METROPOLITAN WATER BOARD.

AT the sitting of the Metropolitan Water Board on Thursday last week it was resolved to expend 4,830*l*. in respect of New River enlargement works, in the neighbourhood of Amwell Marsh and Amwell Hill Pumping-Station.

Charges for Building Supplies.—The Appeal and Assessment Committee reported that a deputation from the London Master Builders' Association had waited upon them on the subject of the charges made for supplies for building purposes, and that the Association were informed that the Board would in due course give the matter their consideration. They had deferred proceeding further with this matter pending a decision in an action recently brought against the Board in connexion with a building supply, but, that matter having been disposed of, they thought the time had now arrived when it would be convenient if the Board adopted a uniform scale of charges for these supplies applicable in all districts. With the exception of the East London District, in which a charge of 2d. per square yard of floor space was made, the practice was to make a percentage charge, ranging from 10s. to 2s. 6d. per cent. on the cost of the proposed building. After giving the matter careful consideration the Committee had come to the conclusion that the most satisfactory method of charge would be a percentage on the estimated cost of the contemplated building, after making a fair allowance for any unusual amount of decorative work, iron or steel work, or other special features affecting the water consumption. There might, of course, be cases (such, for example, as railway construction and sewer work) in which it would be expedient to afford the supply by meter, but those would be exceptions for which no hard-and-fast rule need be laid down. They were of opinion that, subject to these exceptions, the new charge should be 7s. per cent. on the cost of the building. The income derived from building supplies now amounted to about 25,000*l*. per annum, representing some 5,500 building transactions, and the proposed new scale would, they believe, both maintain that income and prove acceptable to the building trade. They had consulted the Finance Committee, who concurred in the proposals, and recommended—"That as from April 1, 1907, the charges for building supplies be at the rate of 7s. per cent. on the estimated cost of the building, after making fair allowance for any unusual amount of decorative work, iron or steel work, or other special features affecting the water consumption, provided that in any exceptional case in which, in the opinion of the Appeal and Assessment Committee, it is expedient to do so, the supply may be given by meter."—Agreed.

Obituary.

MR. JAMES LONGDEN, SHEFFIELD.—The death occurred on Wednesday last week at his residence, Hillsbrough, Sheffield, of Mr. James Longden, head of the well-known contracting firm, Messrs. George Longden & Son, Ltd. Deceased was born at Chesterfield in 1847, but while a mere child his family removed to Sheffield. His father was Mr. George Longden, who established the firm. On leaving school the deceased entered his father's business, and he was taken into partnership on attaining his majority. On the retirement of Mr. George Longden deceased took charge of the business. Its importance may be gauged from the fact that the number of firms capable of competing for very large contracts may be counted on the fingers of one hand, and the firm of Messrs. Longden was amongst the number. Many large contracts have been carried out by the firm, a notable instance being the Midland Railway Station alteration in Sheffield, and they were largely concerned in the rebuilding of the centre of Sheffield some few years ago. Other contracts have included the building of a big asylum at York; much of the Paraga railway station at Hull; the new offices of the Prudential Assurance Company, Ltd., at Brighton, as well as at Sheffield; and the offices of the Sun Company at Hull, besides palatial buildings in London. Mr. Longden has been president of the Sheffield Builders' Association, and at the time of his death he was one of the vice-presidents. He had also been president of the Yorkshire Builders' Association. In politics Mr. Longden was a Conservative, and held a seat in that interest on the Sheffield City Council, representing the St. Philip's ward.

General Building News.

METHODIST FREE CHURCH, HALIFAX.—The new United Methodist Free Church at Boothtown, Halifax, was recently opened. Mr. C. F. L. Horsfall was the architect of the building, which including the gallery at the rear, provides seating accommodation for 450 persons. Adjoining is a Sunday-school, which with its eleven classrooms accommodates 450 scholars. The premises have been erected at a cost of about 4,500*l*., inclusive of furnishing but not of the land.

ST. PETER'S CHURCH, PRESTON, NEAR BRIGHTON.—The Church of St. Peter, Preston, which was partially destroyed by fire last June, was recently reopened. The restoration has been carried out by Mr. H. J. Penfold, under the superintendence of Mr. P. M. Johnston, the architect. The new stained-glass windows were executed by Mr. A. H. J. Westlake. The marble tablets have been preserved, and fixed in the western and north walls of the nave, while the memorial-stones which were formerly attached to the floor of the church adjacent the pulpit have been placed in the centre and cross aisles. The flooring of the church is now of wood blocks. The old gallery, which was burnt down, has not been replaced, but in the western arch above the position of the old gallery an organ by Messrs. Morgan & Smith, of Brighton, will be shortly erected. A new reredos is also to be erected. Electric light has been installed by Messrs. Page & Miles, of Brighton.

NEW CHURCH, WOKING.—The dedication-stone of Holy Trinity Church, Knaphill, which is being erected to replace the present iron building at an immediate cost of 3,600*l*., was laid a short time ago. For this outlay seating accommodation for some 380 people will be provided, but the church, when completed, will hold 200 more. It is being erected by Messrs. J. Norris & Sons from the designs of Mr. J. H. Ball, architect.

WESLEYAN CHURCH EXTENSION, HARROGATE.—On the 27th ult. the foundation-stones were laid in connexion with the extension of the Wesleyan Mission Chapel, New Park. The extension will provide accommodation for fifty people in the large preaching room, an infants' school, and vestry, in addition. Mr. W. Johnson, jun., is the architect of the work.

WESLEYAN CHURCH, RAWMARSH.—The laying of the foundation-stones of the new Wesleyan Church at Rawmarsh took place on the 1st inst. The church is cruciform on plan, with nave and transept, the choir and organ being placed behind the rostrum. A gallery is provided on three sides of the church, and the total accommodation is for 630 adults. Three doors are

provided at the front, and these lead into a lobby, with inner swing doors. At the rear there are three vestries, with cloak-rooms, etc. The outer walls will be faced with Dunford rockies, the roofs slated, and the interior woodwork will be of pitch-pine. The architect is Mr. W. J. Hale, Sheffield, and the contractor is Mr. W. H. Trehern, Rotherham. The toal cost of the entire scheme is estimated at about 5,085*l*.

WESLEYAN CHAPEL, ST. KEVERNE.—The Wesleyan Chapel, which has been erected at St. Keverne to replace the one destroyed by fire, was opened on the 26th ult. The new building is on the site of the old one, and has cost about 2,600*l*. The internal dimensions of the main part of the church are 51 ft. in length and 35 ft. in width. The seating is circular, and is arranged in rising tiers on the amphitheatre plan. At the rear are vestries for the minister and choir, and the usual conveniences. Detached from the main building is a chamber for the acetylene gas plant, which will supply the church with artificial light. There is seating for a mixed congregation of 380 persons. The walls are built of local stone faced with red elvan stone, and with granite dressings to the doorways, windows, etc. The walls inside are faced with stucco. Red deal is used for the timbering, and the joinery, including seating, rostrum, choir, front, etc., is of pitch-pine, The heating is by low-pressure hot-water system, and the ventilation is by inlets at the sides. The architects are Messrs. John Wills & Sons, of Derby, and the builder is Mr. George Bond, of Hayle.

BAPTIST CHAPEL, MARKET HARBOROUGH.—The new Baptist Chapel and Sunday-school extensions at Market Harborough have now been completed and opened. Messrs. Geo. Baines & Sons, of London, prepared the plans for the building, which will accommodate about 543 persons, and which was erected by Messrs. H. Herbert & Sons, of Leicester, under contract for 1,982*l*., which amount also included alterations and additions to the existing school premises.

CALVINISTIC METHODIST CHAPEL, MAESTEG.—A new English Calvinistic Methodist Chapel has been erected in Bethania-street, Maesteg. The structure is built of native stone, with Ruabon terra-cotta dressings. Underneath the chapel is a hall to seat 370. The chapel will seat 350, plus gallery extension, when required, and is lighted with inverted incandescent lights. The cost is 2,400*l*. The plans were prepared by Mr. Arthur L. Thomas, architect, Pontypridd, and Mr. Thomas Thomas, contractor, Wood-street, Maesteg, was the builder.

C.M. CHAPEL, BANGOR.—On the 23rd ult. the new Berea chapel at Glanadda, Bangor, was opened. The architects were Messrs. R. Davies & Son, Bangor, and the contract was placed in the hands of Mr. John Williams, Bangor. As it now stands, the new chapel cost 4,200*l*., including a fine new organ. Accommodation is provided for 610 persons, and adjoining is a schoolroom holding 300, a classroom for 80 persons, and four smaller rooms.

PROPOSED NEW SUNDAY-SCHOOLS, COVENTRY.—It is proposed to build new Primitive Methodist Sunday-schools at Paradise, Coventry. The premises will join the church at the rear and face Cross-road. They will consist of an assembly hall with central entrance porch, and on either side five classrooms will be placed. Four of the classrooms will open out into the assembly hall by means of folding doors, thus increasing the accommodation for special occasions. In addition there will be two side entrances towards the rear of the schools leading to two large rooms, each with accommodation for fifty to sixty persons. A kitchen, lavatory, cloakrooms, and heating chamber will also be provided. Mr. Davidson, architect, has prepared the plans.

FREE LIBRARY, TWICKENHAM.—The new public free library at Twickenham was opened recently. The building is situated in Garfield-road. The accommodation comprises, on the ground floor, an entrance-hall with mosaic floor, a reading-room to accommodate eighty readers, a magazine-room on the opposite side with seats for thirty people, and the lending library, on the open-access system, with accommodation for 25,000 books. On the first floor there is the reference library, with accommodation for thirty readers and 3,000 volumes. In addition there is a lecture-hall to seat 110 persons, the librarian's room, and two retiring-rooms adjoining. For the storage of disused or unbound volumes a store-roo m has been provided in the basement, with accommodation for 20,000 volumes. The architect was Mr. Howard Goadby, F.S.I., and Mr. B. E. Nightingale has carried out the contract.

PUBLIC OFFICES FOR BETHNAL GREEN.—The Borough Surveyor of Bethnal Green Borough Council has been instructed to survey a site in Cambridge-road, at the north-east corner of Patriot-square, for new public offices, and to submit particulars to the Law and General Purposes Committee with a view to that body making arrangements to invite competition from architects for plans and drawings. To avoid delay a Provisional Order is to be applied for for the compulsory acquisition of the site. Mr. E. H. P. Eason, of the firm of Messrs. Reynolds & Eason, Bishopsgate-street Without, is to be appointed as professional valuer to negotiate on behalf of the Council for the purchase of the property required.

HOME FOR THE DESTITUTE, SHEFFIELD.—A new home is being erected for the Little Sisters of the Poor in Heeley-bank-road, Sheffield. The building stands on a site, 3½ acres in extent, and will be of brick. The main structure, which will have a frontage of 272 ft., will have a southern aspect. Half the basement will be utilised for kitchens, sculleries, refectory, general stores, heating apartment, etc. White bricks will be used here to increase the light. On the ground floor will be a central main entrance, with hall and staircase. To the right and left are rooms mainly used by the Sisters, linen and other similar apartments. At the back of these rooms runs a corridor, on the far side of which is the chapel. On the south-west side is the wing for the female inmates, with day-room, scullery, etc. The men's wing on the north-east side will be similarly arranged. The first floor is given up chiefly to the old people, and consists of dormitories, infirmary wards, sculleries, and conveniences. From this floor there is also access to the gallery of the chapel. The second floor is almost a repetition of the first floor, several of the dormitories here being set aside for the Sisters. The third floor is in the roof, and is mainly utilised for store-rooms. There are also apartments for the accommodation of inmates, in case the other parts of the Home are full. Outside iron balconies with fire escapes, staircase, and other arrangements are provided in case of fire. The scheme also includes a laundry, stables, piggeries, a smoke-room for the men, and workshops. The site will be enclosed by an 8-ft. brick wall, the entrance lodge being in Heeley-bank-road. Mr. Edmund Winder, architect, Corn Exchange-buildings, Wharf-street, has prepared the plans. The contract, which has been let to Messrs. T. Roper & Sons, Mowbray-street, Sheffield, is for 22,505*l*. 10s. The cost, however, will probably reach 26,000*l*., owing to extensions, which will have to be made to the chapel, and other alterations of the original plan.

NEW SCHOOL, CHESTER.—At a recent meeting of the Chester Education Committee it was decided to recommend the acceptance of the tender of Messrs. John Mayers, Son, & Co., of Canal-side, Chester, for the erection of a new public elementary school in George-street, according to plans, etc., prepared by Mr. H. Beswick, for the sum of 4,466*l*., which was stated to be the lowest.

COTTON MILL, BOLTON.—A new mill, to be known as the Falcon Mill, is now being erected by the Falcon Spinning Company, Ltd., in Halliwell-road, Bolton. The plans have been prepared by Mr. George Temperley, Bolton, and the mill is estimated to hold 90,000 spindles. Mr. Jonathan Partington, of Middleton, is the contractor for the building, and the machinery is to be supplied by Messrs. Dobson & Barlow, Ltd., of Bolton. The mill is to be electrically driven, and Messrs. Musgrave & Sons, Ltd., of Bolton, will supply the steam turbine engines, the motors and the remaining parts of the electrical driving being in the hands of Siemen Bros., Ltd., electrical engineers.

FACTORY EXTENSION, YORK.—Additions are being made to the works of Messrs. Rowntree's, Ltd., at Haxby-road, York. The "Almond Block," which will be 240 ft. in length, 60 ft. wide, and 90 ft. in height, is in the foundation stage. The space taken up by the building will be 1,421,000 ft. cube, and the estimated cost is 30,000*l*. The other new building, known as the "Melanjeue Block," is now fully equipped with machinery and is being worked. The space occupied by this structure is represented by about 800,000 ft. cube. Mr. W. H. Brown, architect, designed the buildings.

PROPOSED NEW HIPPODROME, DUNDEE.—Plans have been prepared of a new hippodrome, which it is proposed to erect in South Lindsay-street, Dundee. The theatre is to be constructed entirely on the cantilever principle, and will be of brick, steel, and concrete. The ventilation will be on the Plenum system. On the ground floor will be the orchestra stalls and pit, on the first tier the dress circle, and the second tier the gallery. There will also be two boxes on each side of the proscenium, and at the back of the dress circle four small boxes with a fireproof chamber for working the cinematograph. The architects for the work are Messrs. J. D. Swanston & Syme, Kirkcaldy, and the resident architect is Mr. Leslie Ower, Dundee.

NEW HYDRO, PEEBLES.—The new Hotel Hydropathic, Peebles, which has been erected to replace the building destroyed by fire in 1905, has now been opened. The new building was designed by Mr. J. Miller, A.R.S.A., Glasgow, and is in the Georgian style of architecture. The total frontage is 210 ft., of which the main block represents 150 ft. and the wings 30 ft. each, the building comprising a basement and four floors. From the entrance doorway a flight of marble steps 17 ft. in width leads to the grand corridor, which is 210 ft. long and 13 ft. wide. At the west end is the conservatory, and at the east end the dining hall, in which 300 people can dine at once. There are in all 200 bedrooms.

ISOLATION HOSPITAL, MERTHYR.—The Merthyr Borough Council's new central isolation hospital was opened by Mr. Keir Hardie, M.P., on the 23rd ult. The hospital is situated about a mile south of the centre of the town, near the old Plymouth offices. Owing to the slope of the land, the buildings have been arranged in three terraces, each 10 ft. above the other. On the second terrace there are two pavilions, one for scarlet fever and the other for typhoid, each affording accommodation for fourteen patients in the main wards and two in special wards set apart for private cases. On the third terrace stands the laundry and disinfecting block. The buildings were designed by Mr. T. F. Harvey, the Borough Engineer, and the contractors were Messrs. Linton & Company, of Newport, whose tender amounted to 13,500*l*.

Stained Glass & Decoration.

CHURCH FURNITURE.—The Guild of Handicraft have been entrusted by Mr. E. W. Allfrey, architect, Oxford, with the production and fixing of an oak screen and stalls at St. Helens Church, Abingdon; and also with some special carving work, including a figure of Madonna and Child and one of St. Michael, for an oak reredos in Urswick Parish Church, under the instructions of Messrs. Settle & Brundrit, architects, Ulverston.

Foreign.

GERMANY.—An important and noteworthy improvement has just been effected in the town of Elberfeld, Prussia, where a whole district, known as the Island, which was subject to periodical inundations from the Wupper, has been pulled down and rebuilt on a higher level. The houses were centuries old, small, huddled together, and quite incapable of modern sanitary requirements; the streets were 5 metres wide or less and below the level of the river. Now, at great expense, incurred by the municipality and landlords, the river has been embanked, the 10-metre wide streets have been constructed above the level of the highest known flood, and the foundations of the houses raised correspondingly.——Experiments have been made for the last three years in Munich with kerb stones made of concrete strengthened by cast iron. Although the initial cost of these curbs is greater than that of granite these latter wear out so soon where there is much traffic, and their renewal involves such expense connected with the making good of disturbed wood or asphalt paving, that in the long run experience shows the relative cost to be as 1 to 3.——The new building regulations for Würtemberg so far assist modern æsthetic aims that the building line is not fixed in streets, but buildings may stand back from a given line. The Act also requires that new designs shall show consideration for neighbouring historical buildings, and shall not prejudice the peculiarities of the town or landscape.

AUSTRIA.—The first prize in the competition for a theatre to be built at Aussig, Bohemia, was awarded to Herr Rudolf Krauss, of Vienna.——Dr. Arnold Karplus, of Vienna, was awarded the first prize in the competition for a new hospital to be built in Falkenau.——Last September was consecrated the Church and Convent of the Heart of Jesus, situated in one of the important thoroughfares of Vienna. This imposing group of buildings is the work of Herr Gustav Ritter v Neumann, and is in the Romanesque style, the church tower being designed on the lines of Rhenish towers. Neumann also designed the Cenisius Church in Vienna besides a large number of other churches on the Austrian Crown property.——The new Savings Bank Offices in Vienna, which were recently opened, were built from the designs of Herr Otto Wagner, at a cost of three million francs.

RUSSIA.—The Russian Society of Architects, St. Petersburg, announces an international competition for a warehouse and flats to be built in St. Petersburg. Designs to be received by the Society of Civil Engineers, 10, Serpuchovskaja, St. Petersburg, not later than 4 p.m., May 14, 1907. First prize, 2,000 rubel.

ITALY.—An Italian exhibition will be held in Bochum, Westphalia, from June 1 to 15, in order to promote Italian emigration in Europe. The sections will illustrate Italian work, craft, and art in Germany.

SOUTH AFRICA.—At Durban the Eastern and South African Telegraph Company's new building is well on its way to completion; Mr. W. F. Johnstone is the builder, the design being by Mr. J. W. Rhodes, the company's architect. When completed, it is claimed that the building will be one of the most substantial of its kind in Durban; it will comprise quarters for the staff and a house for the superintendent of the company. Colonial brick and Greytown bluestone

are being used throughout the entire building. The bedrooms, of which there are forty-eight, will average 12 ft. 6 in. by 16 ft. The floors are admirably suited to the climate of Durban, being of solid cement. Commodious workshops and stores, each 25 ft. square, are to be erected; a tennis court also will be laid out for the use of the staff. Mr. Robinson, the clerk of the works, expects that the building will be finished by the end of June next.——At Johannesburg the Transvaal Institute of Architects has been asked to conduct the examination of the Royal Institute of British Architects, London, in Johannesburg for South Africa. The examination will be held simultaneously in London, Toronto, and Johannesburg, from November 14 to 21 inclusive. The following are the gentlemen who have been appointed by the Transvaal Institute as a committee to conduct the examination:—Mr. W. Leck, F.R.I.B.A., Mr. Herbert Baker, F.R.I.B.A., and Mr. G. A. Dickinson, F.R.I.B.A. (Chairman). —— The result of the architectural competition for Grey University College House, Bloemfontein, is as follows:—The Committee of Assessment for the said competition has selected three drawings of the twenty-four sets submitted, and the successful competitors are—1. Messrs. Street, Wilson, & Paton, Durban; 2. Mr. S. Hudson, Durban; 3. Messrs. Schaerer & A. Reynolds, Johannesburg. ——At Cape Town the Rhodes memorial is in progress. Very little metal and practically no wood will be used in the erection, which is of the nature of a columned portico with a Roman Doric order.——The Government has sanctioned an expenditure of 11,500*l.* for the purpose of erecting a town hall and municipal offices at Potchefstroom; tenders will be called for shortly.——At Krugersdorp the building of the new Town Hall has been commenced, though the attitude the public have taken towards the scheme is that the construction of a town hall in these days of empty buildings and offices and general depression is open to criticism. The Council are inviting Lord Selborne to lay the foundation-stone.

Miscellaneous.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—Messrs. Bare & Jeffree, quantity surveyors, late of 9, Southampton-street, Bloomsbury-square, have dissolved partnership, and Mr. Thos. E. Bare has taken Mr. Sidney Leaning, F.S.I., and his son, Mr. Arnold Bare, P.A.S.I., into partnership. The firm will be styled Bare, Leaning, & Bare, and the business will be carried on at Kingsgate House, 115, High Holborn, W.C.——Messrs. Henderson & Glass, steel, iron, and general metal merchants (Liverpool), have taken into partnership Mr. William Duncan Henderson and Mr. Robert Glass, sons of the senior partners; the style of the firm remaining as before, Henderson & Glass.

MANU-MARBLE.—This is an artificial stone which closely resembles marble in its appearance and chemical composition. The markings go right through the stone, so that in the event of the stone being accidentally scratched, the face can be rubbed down and repolished. The sizes in which the slabs are manufactured are 16 in. by 16 in., 21 in. by 12 in., and 21 in. by 14 in. Mouldings and skirtings are also made. Manu-marble is made in many colours and designs and is intended to be used as a cheap substitute for marble in such places as restaurants, theatres, and hotels.

MILLBANK EMBANKMENT.—It is to be hoped that when the removal of the temporary Vauxhall bridge is completed steps will be taken to lower the riverside road to its former level. The raising of the roadway in order to provide an approach to the bridge has had an untoward effect upon the aspect of the Tate Gallery, which now appears as sunk in a hollow, and, besides, has created inclines which, on behalf of the general traffic and of draught-horses, should be reduced forthwith.

CANTERBURY CASTLE.—The Corporation have agreed to purchase from the Canterbury Gas and Water Company, at the price of 1,900*l.*, the remains of the late XIth century castle, which, it is believed, was erected by William the Conqueror to overawe the inhabitants of the then populous and thriving *Civitas Cantuariæ*. The castle claims to be in point of size the third largest in this country next after those of Norwich and Colchester. Having been converted into a prison, *temp.* Edward II., it has served during many years past as a coal-yard and depôt for stores. It is stated that pending a ratification of the purchase Alderman F. Bennett Goldney, F.S.A., Mayor of the city, has undertaken to accept financial responsibility, and a committee has been formed to act with him in the matter.

ST. PAUL'S CHURCHYARD, HAMMERSMITH.—At a sitting of the Consistory Court of London in St. Paul's Cathedral, on March 13, Dr. Tristram, K.C., Chancellor of the Diocese, agreed to grant a faculty for the widening of Queen-street, Hammersmith, by the inclusion of 3,204 sq. ft. of the disused graveyard of the Parish Church of St. Paul. The improvement will render the roadway 60 ft. wide, and enable the construction of a tramway. The borough council will pay 1,100*l.* for the land, and will defray the costs of obtaining the faculty and removing and re-interring all human remains disturbed by the work. The vicar and churchwardens undertake to re-erect the boundary railings and kerb between Queen-street and the rest of the churchyard.

COAL OUTPUT.—The Board of Trade *Labour Gazette* contains a preliminary statement relating to the coal output for the year 1906 in the United Kingdom. The output of coal has steadily increased of late years. The year 1904, it will be remembered, was a record year with an output of 232,428,272 tons; this was again exceeded in 1905 with 236,111,000 tons; but the year 1906 has eclipsed these records with an increase of nearly 15 million tons or 6.3 per cent., the figures being 251,051,000 tons. The export of coal shows similar advance. In 1904 the export exclusive of bunker coal was 46,255,547 tons, and inclusive 65,822,035 tons; in 1905 the figures were 49,359,272 tons, exclusive of bunker coal, and 66,745,418 tons inclusive. These figures compare with 57,792,204 tons exclusive, and 76,382,417 tons inclusive in 1906, an increase in the export of about 11 million tons during the three years. The number of persons engaged in mines worked under the Coal Mines Regulation Act was 882,345, an increase of 2.8 per cent. since 1905, and the average wage was about 3 per cent. higher at the end of 1906 than at the end of 1905. The first two months of the present year have shown a marked rise in prices; Cardiff best steam coal has, for instance advanced from 13s. 9d. in January and February, 1905, to 18s. 6d. in 1907, and house coal in London shows an advance of 3d. per ton on last year.

REBUILDING OF THE QUADRANT.—Mr. W. F. D. Smith asks the Secretary to the Treasury in the Parliamentary Papers whether it is proposed to rebuild the whole of the Quadrant, as leases fall in, upon the same design as that of the building now being erected; and, if so, whether he can undertake that further consideration shall be given to the views of lessees and others before further building becomes necessary.—Mr. Runciman, in reply, says: The answer to the first part of the question is in the affirmative. The designs are intended to provide for the rebuilding of the whole of the Quadrant as one consistent scheme. As he had already informed the honourable member by letter, the plans were most carefully considered both by the late and by the present Government before they were agreed to; and it would be too late now, when a part of the scheme has almost been carried out, to make any alteration in them, even if any such could be shown to be desirable.

TIMBER FROM IRELAND.—In the Parliamentary Papers Mr. Ginnell asks the Chief Secretary for Ireland whether the Department of Agriculture has drawn his attention to the increased quantity of timber exported from Ireland during the last four years as compared with previous years, and the practice of landlords to strip of trees estates they are about to sell, and has the Government any powers to stop or check the destruction of trees or to require fresh plantation; and, if not, will he ask Parliament for such powers this Session.—Mr. Birrell, in reply, states that the new returns of exports and imports issued by the Department of Agriculture do not furnish approximately complete figures for any year earlier than 1904. 115,000 tons of timber were exported from Ireland in each of the years 1904 and 1905. The figures for 1906 are not yet available. The Estates Commissioners have no power to interfere with the cutting of timber on estates about to be sold. They are aware that allegations have been made that some landlords have cut down timber in anticipation of sales. The commissioners are also aware that tenant purchasers have disposed of their timber to a considerable extent. They have endeavoured to prevent the practice, as diminishing the security for the advance, but their existing powers do not appear to be effective. The question whether further powers should be provided is one of much difficulty, but the matter will be considered in the event of the introduction of legislation for amending the Land Acts.

THE STATE OF ST. PAUL'S.—The committee of experts appointed to inquire into the stability of St. Paul's Cathedral have, the *Evening Standard and St. James's Gazette* understands, drafted an interim report. The experts composing the committee are Sir Aston Webb, R.A., Mr. T. E. Collcutt, R.A., and Mr. J. Belcher, A.R.A., and it is understood that their report deals almost entirely with the probable effect of constructing a sewer beneath the south side of the cathedral. A unanimous opinion is expressed that the tunnelling operations connected with the laying of the sewer would be a serious additional source of danger to the structure. There is still time to consider an alternative course for the sewer to take, as the work has only reached a point some two miles east of St. Paul's churchyard. Mr. Fitzmaurice, the engineer to the London County Council, which is constructing the sewer, has stated that it would be difficult to lay the sewer further south, but the difficulty is believed to be not insurmountable. The interim report has been forwarded to Mr. Macartney, the architect to the cathedral, who intends to put it before the Dean and Chapter as early as possible. The report will also be communicated to the Ecclesiastical Commissioners and to the London Council in due course.

HOLYROOD ABBEY.—The members of the Edinburgh Architectural Association on Saturday, last week, by permission of the First Commissioner of Works, visited Holyrood Palace and Chapel. They were welcomed on behalf of the Crown and conducted over the building by Mr. W. T. Oldrieve, Chief Architect to his Majesty's Office of Works. Mr. Oldrieve, addressing the company, which numbered between 200 and 300, said the controversy upon the subject of the proposed restortaion of the abbey was, in his opinion, a most gratifying evidence of the general awakening of the nation to a sense of responsibility for the better preservation of our treasures of ancient architecture. Much of the divergence of opinion had, he believed, arisen from the point of view from which the subject had been considered. He made two suggestions—(1) That at least they as architects should look at the beautiful architectural relic as a piece of fine art; and (2) that all parties interested should unite in a common effort to have the tower, choir, and transepts built as an entirely new building, the ancient nave forming a dignified approach, and every effort being made to preserve what remained of it from further decay. If means were taken still further to preserve what remained from the natural process of decay there was no reason why the grand old ruin should not be still among the art treasures of Scotland centuries hence, when, as he would fondly hope, the chapel of the Knights of the Order of the Thistle stood—then no longer new—prized and admired for its own intrinsic beauty.

WATERLOO STATION IMPROVEMENTS.—One section of the great improvement scheme which is being carried out at Waterloo Station by the London and South Western Railway at a cost of 2,000,000*l.* will shortly be finished. At the present time there are eighteen platforms at Waterloo, accommodating seven lines of track. The improvements will allow of an eighth being shortly added. The final frontage in the Waterloo-road will be a structure of several stories; the lower floors will provide room for parcels offices, etc.

THE LABOUR MARKET IN THE COLONIES.—The April circulars of the Emigrants' Information Office state that there is a very large demand in *Canada* at the present time for railway labourers—such as permanent way men, trackmen, platelayers, pick and shovel men, navvies, carters, stablemen, and teamsters—hundreds of miles of railway being under construction. The demand for mechanics is not so urgent, but the manufacturing industries continue busy, and hardworking men in the building, metal, and engineering trades should have little difficulty in procuring employment at good wages. Coal miners have a very fair opening in Nova Scotia and British Columbia. The demand for labour in *Australia* has considerably improved, and there is a general demand up-country—especially in the summer season—for competent men accustomed to work agricultural machinery, or able to work on a farm, garden, or orchard, or on a sheep or cattle station. The demand for mechanics is less, but competent carpenters, bricklayers, masons, blacksmiths, fitters, etc., should be able to get work without difficulty. There is some demand for coal miners in the mining districts south of Sydney. In *New Zealand* the building, engineering, and manufacturing trades generally are busy, and steady and competent mechanics, if they have a little money on landing, have good prospects of employment. Emigrants are warned against going to *Cape Colony* in search of work. There is a plentiful supply of mechanics on the spot, many of whom are unable to find employment. In *Natal* the supply of labour is equal to the demand, and is over-abundant in the building trades both in Durban and in Pietermaritzburg.

AN AID TO DRAWING FROM THE ROUND.—Mr. H. G. Murray sends us a sample of a simple instrument called the "vista plane," of his invention, intended to aid students in finding the direction and proportion of lines in drawing from objects in the round. It consists of a circular piece of glass, about 3 in. diameter, in a frame and with a handle, the vertical and horizontal centre-lines (normal to the line of the handle) being marked by a strong line, with two other vertical and two horizontal lines, less heavily marked, dividing the main part of the field of the glass into four equal squares, leaving spandrel compartments next the margin. The idea is that, on holding this up between the eye and the object or group of objects, the centre-line on which the whole subject is balanced will be readily found

while the minor lines will assist in fixing the relative proportions of parts and the inclinations of the bounding lines, etc. It seems to be a contrivance which may be of practical value.

PRIMITIVE METHODIST CHURCH BUILDINGS.—At the Centenary Conference of the Primitive Methodists, to be held at Leicester in June, it is proposed to open a Centenary Fund of 250,000*l.*, which is to be raised in the three years 1907-10. It is intended that three-fifths of the amount shall be allotted for local purposes, including the erection of churches, manses, and schools. During the last thirty-five years the Connexion has built property amounting to four millions, 16s. 8d. out of every pound of which has been raised and paid. The strength of Primitive Methodism lies chiefly in the northern counties and in East Anglia, among the miners of Northumberland, Durham, and Yorkshire.

TIMBER PRODUCTS OF LIBERIA.—In his annual report, just received at the Foreign Office, Captain Wallis, the British Consul at Monrovia, states that the forests of the interior of Liberia are reported to contain valuable timber. A species of ebony is reputed to exist there (price 6*l.* per ton). Cam-wood is of common occurrence in the forests. It is a hard, durable, and handsome wood, and is used a great deal by the natives for making beams and pillars for their dwelling-places and court-houses. Its weight is considerable, and it seems to be practically everlasting. The difficulty of shipment, however, owing to its weight, greatly enhances the cost, which varies between 10*l.* and 15*l.* per ton. A species of mahogany (*khaya*) exists in the forests, and has a limited market in Europe. African teak (*Oldfilldia*) has also been found. It is a difficult matter for merchants to get these woods down to the coast owing to absence of transport facilities. Wherever possible the timber is floated down the rivers as far as they are navigable, but this lack of means of transport must act detrimentally upon the development of the timber trade. Merchants are obliged to keep within reasonable distance of the navigable and lower waterways, and their field of labour is therefore limited.

IMPORT TRADE OF SOUTH AFRICAN COLONIES.—A comparative statement has been published by the South African Statistical Bureau, showing the value of the imports into Cape Colony, Orange River Colony, Natal, and Transvaal during the year ended December 31, 1906, as compared with the preceding year. The imports of cement in 1906 were as follows, the figures for 1905 being given in parentheses:—Cape Colony, 97,000*l.* (102,000*l.*); Orange River Colony, 9,000*l.* (10,000*l.*); Natal, 56,000*l.* (50,000*l.*); Transvaal, 31,000*l.* (56,000*l.*). Furniture was imported to the following extent:—Cape Colony, 380,000*l.* (469,000*l.*); Orange River Colony, 81,000*l.* (70,000*l*); Natal, 165,000*l.* (261,000*l.*); Transvaal, 290,000*l.* (358,000*l.*); The imports of iron and steel manufactures were:—Cape Colony, 487,000*l.* (484,000*l.*); Orange River Colony, 123,000*l.* (40,000*l.*); Natal, 177,000*l.* (271,000*l.*); Transvaal, 417,000*l.* (387,000*l.*). Paints, turpentine, varnish, etc.:—Cape Colony, 89,000*l.* (93,000*l.*); Orange River Colony, 9,000*l.* (9,000*l.*); Natal, 38,000*l.* (51,000*l.*); Transvaal, 42,000*l.* (48,000*l.*). Wood, manufactured and unmanufactured:—Cape Colony, 229,000*l.* (428,000*l.*); Orange River Colony, 99,000*l.* (97,000*l.*); Natal, 142,000*l.* (243,000*l.*); Transvaal, 329,000*l.* (556,000*l.*). It is explained by the bureau that the figures for 1905 are not so complete as those for 1906.

AN ARCHITECTURAL DIRECTORY.—The British Manufacturers' Publishing Company will issue at the end of this month a "Directory of Architects and Surveyors," edited by Albert C. Freeman. The work, being the first of this character devoted to the profession, will contain a complete directory of all practising architects and surveyors, together with their degrees, qualifications, diplomas, works published, and other information throughout the United Kingdom and the principal Colonies. It will also comprise directories of quantity surveyors, municipal engineers, and general information of a valuable character.

Legal.

ARCHITECTS' ACTION FOR THE RECOVERY OF FEES.

MR. JUSTICE JELF had before him at Glamorgan Assizes on the 22nd ult. an action in which Messrs. James & Morgan, architects, Charles-street, Cardiff, sought to recover from the Dowlais Constitutional Club Buildings Company, Ltd., the sum of 174*l.* 14s. arrears of fees due for work done.

Counsel on both sides had a consultation with his lordship in his private room, and on coming into court it was intimated that they had come to terms of agreement.

Judgment was entered for the plaintiffs, by consent, for 120*l.*, to include costs.

SAFER SCAFFOLDING.

DR. WYNN WESTCOTT held an inquiry at Hackney respecting the death of James N. Henderson, aged fifty, a plumber, late of 3, Weston-road, Acton-green, Chiswick.

While working on a scaffold near the roof of a newly-erected warehouse at Carysfort-road, Stoke Newington, the board he was standing on tilted and he was thrown to the ground, a distance of 30 ft. He was removed to the German Hospital, where he died from the injuries sustained.

In answer to a juror, a witness said that it was not usual to clamp together or fasten the ends of boards on a scaffold.

Ther juror: Then it ought to be.

Mr. J. Good, Factory Inspector, informed the jury that the whole subject of scaffold accidents was under the consideration of a committee appointed by the Home Secretary, and the result of their deliberations would be a code of rules which would have statutory force. He (the Inspector) had no doubt that provision would be made to prevent a recurrence of accidents of the kind they had just inquired into. One of the regulations would be that no scaffold-board end would be allowed to project more than 6 in. over a putlog unless secured.

The coroner remarked that the Inspector's information was very satisfactory.

A verdict of accidental death was returned.—*Daily Telegraph.*

Patents of the Week.

APPLICATIONS PUBLISHED*.

5,376 of 1906.—E. SUNDERLAND: *An Automatic Disinfector for Flushing Cisterns of Water Closets.*

This relates to a disinfecting apparatus, and consists of a receptacle, a body of disinfecting matter disposed in the receptacle, an inlet tube disposed in said receptacle and extending above the body of disinfecting matter, a closure for the receptacle provided with a central depression, and a perforated outlet tube disposed through and projecting slightly above the closure and extending downward into the body of disinfecting matter.

5,436 of 1906.—E. R. SUTCLIFFE and W. A. RICHARDS: *Apparatus for Moulding Roofing Tiles and like articles.*

This relates to an apparatus for effecting the pressure of non-uniform tiles, bricks and like, consisting of a bell crank lever operated by a train of spur wheels, a crank, and a connecting-rod, to press a press-head having a die plate thereon into a mould in a revolving table, a bottom plate having suitable recesses or projections thereon and means for revolving the mould table.

5,662 of 1906.—C. R. WATTLES: *Floor Dressing Machines.*

This relates to a floor dressing machine, and consists of a frame, a handle pivotally secured to the frame, wheels rotatably secured to the frame, a dressing roll secured to a shaft, means for supporting the dressing roll shaft in bearings in the frame, a motor secured to the frame, and means for operatively connecting the motor with the dressing roll shaft to simultaneously revolve and reciprocate the shaft and dressing roll.

5,868 of 1906.—A. ROMER: *Artificial Mill-stones.*

This relates to artificial mill-stones manufactured from concrete rammed together and united into a uniform mass, and formed of a grain of suitable size and hardness embedded in any suitable material, a mill-stone being made up of two zones, the inner one of which next to the feeding inlet is formed of highly resisting material, while the outer zone contains the grinding grain embedded in a softer material.

9,381 of 1906.—T. C. FAWCETT, LTD., and J. W. BOTTOMLEY: *Multiple Roller Machine for Making Bricks, Tiles, and like Clay Goods.*

This relates to a plastic brick or like moulding machine, and consists of a plurality of rollers arranged in pairs one behind the other, the second of each succeeding pair of rollers being of smaller diameter, or set further apart, than the preceding pair of rollers to give a gradually increasing clay space between each pair of rollers.

11,235 of 1906.—T. M. CANNON: *Latches and Bolts.*

This relates to latches and bolts. Out of one end is cut a slot about 1 in. long, any width, from the remaining end part is cut off about ½ in., while at the opposite end of the plate is cut a slot about 1 in. long and of any desirable width in which the rivet or pin in the "keep" plate works, so that by pushing the latch forward it acts as a lock or bolt and by the reverse action it can be used as an ordinary thumb-latch.

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

12,136 of 1906.—J. H. HILL: *Front Door Latch.*

This relates to a latch or lock for house doors, provided with a switch for operating a burglar alarm in them having a locking staple with a movable part operated from outside the door by a master key, so that a person in possession of the master key can enter the house without sounding the alarm.

14,129 of 1906.—R. MORRISON: *Lavatory Basins.*

This relates to a lavatory basin and consists in the formation of the lipped inlet whereby the water is introduced into basin bowl, so as to give a circular and forward direction to the water, and thus cleansing the bowl completely and continuously.

15,565 of 1906.—E. G. HARCOURT: *Door Furniture.*

This relates to door furniture, as employed with locks of the mortise and rim types, and consists in the adaptation of a handle or grip whereby it can be employed in conjunction with locks of either of the said types.

23,181 of 1906.—F. GESCHONK: *Pipe Wrenches.*

This relates to adjustable pipe wrenches in which the shaft is somewhat bent out at its upper part and the jaw, which is movably and adjustably mounted on said shaft, is constructed in cornered fashion, *i.e.*, bent twice or several times in sharp corners for the purpose of employing the wrenches for round as well as for edged material.

14,849 of 1906.—A. J. PADGHAM: *Casement Stays.*

This relates to casement stays, comprising a stay bar provided with teeth, ribs, projections or their equivalent upon the top side and slidable within a carrier adapted to be swivelly connected to the fixed casement frame, said carrier being fitted with two pivoted levers or pawls, the lower ends of which are adapted to automatically engage with the said stay bar, and the said levers being connected to the opposite sides of and movable with a plunger, and a spring acting on said plunger so as normally to bring the levers into engagement with the stay bar.

17,149 of 1906.—F. S. PERKINS: *Catch or Fastening for Windows, Doors, and the like.*

This relates to a fastening for windows, doors, or the like, and consists of an eccentric tumbler with a projection for operating same working in an aperture of a casing, the tumbler being so pivoted that it is automatically thrown out of action, and so retained by its own weight.

21,779 of 1906.—C. K. GEORGE and J. BURNETT: *Stone Saws.*

This relates to a stone saw having teeth of a common thickness throughout their height arranged at a suitable distance apart, and intermediate portions of a less thickness than and corresponding in height to the teeth arranged alternately at opposite sides of the jaw and lying entirely in the vertical plane of the teeth and having concave lower edges, the said comparatively thin intermediate portions affording interdental spaces extending throughout the height of the saw and adapted to permit the free passage of abrasive material to the bottom of a kerf in which the saw is disposed.

22,103 of 1906.—O. ARNTZEN: *Apparatus for Cleaning the Front of Houses.*

This relates to an apparatus for cleaning the fronts of houses, comprising a reservoir containing a perforated casing serving as a receptacle for chemicals, pipes for carrying the water, and a triple faucet on the inlet pipe to cause the water to flow either through the reservoir or around the reservoir or through the perforated casing vertically.

14,149 of 1906.—S. A. PERRY: *Automatic Flushing Apparatus.*

This relates to an automatic flushing apparatus for urinals and the like, consisting of a series of double siphons or traps, a vertical drum surrounded by a cap of greater size and forming therewith an annular channel communicating with the water channel tank or cistern, a hollow disc at the upper end of said drum communicating with the double siphons or traps and terminating in a central boss provided with inlet orifices, and means for preventing the unsealing of said siphons or traps.

14,196 of 1906.—G. J. MOSCHOS: *Doors.*

This relates to a double-leaved door in which two leaves or parts are separately hinged at or near one edge, and a detachable fastening is provided for arranging said leaves in relation to each other.

14,814 of 1906.—S. S. HELLYER: *Water-Closet Pans, Slop Sinks, and the like.*

This consists of a combined water-closet pan, slop sink, or the like, and flushing cistern, the cistern being made in fire-clay, earthenware, or other suitable material, in one piece with the pan and other parts of the closet, slop sink, or the like, so as to leave no space or crevice between them for the access of moisture and dirt, and being situated at the back of the pan and immediately

PATENTS.—*Continued on page 433.*

List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number: Competitions, iv.; Contracts, iv. vi. viii. x.; Public Appointments, —.; Auction Sales, xxxii.

Certain conditions, beyond those given in the following information, are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bonâ-fide tender unless stated to the contrary.

The date given at the commencement of each paragraph is the date when the tender, or the names of those willing to submit tenders, should be sent in.

*** It must be understood that the following paragraphs are printed as news, and not as advertisements: and that while every endeavour is made to ensure accuracy, we cannot be responsible for errors that *may* occur.

Competitions.

* APRIL 15.—**Manchester.**—CHURCH.—The Manchester and District Congregational Board invite design for proposed church, Stretford-road. For conditions, etc., see advertisement in this issue.

* NO DATE.—**Glossop.**—NEW SCHOOL.—The Glossop Education Committee invite competitive plans for new elementary school for Hadfield, to accommodate about 300 children. The architect whose design is placed first will be entrusted with the work, while the one placed second will receive premium of 20*l.* Designs will only be accepted from such architects practising within a radius of thirty miles of Glossop Town Hall. Particulars may be obtained on or before Friday, April 12, of Mr. J. Walkden, Secretary, Howard-chambers, Glossop, on depositing 1*l.* 1s.

Contracts.

BUILDING.

APRIL 6.—**Alphington.**—SCHOOL.—Devon County Education Authority invite tenders for erecting a new infants' school for 120 children at Alphington, near Exeter; also for work in connexion with remodelling the offices of the existing school, alterations to drainage, playgrounds, etc. Apply to the architect, 1, Richmond-road, Exeter, on or before April 6, enclosing a deposit of 1*l.* 1s. for a copy of the bills of quantities.

APRIL 8.—**Aboyne.**—HOUSE.—The excavator, mason, carpenter, slater, plumber, plaster, and painter and glazier works of dwelling-house to be erected at Aboyne. Plans and specifications may be seen at Tigh-na-geald, Aboyne, or with Mr. Geo. Bennett Mitchell, architect, 148, Union-street, Aberdeen.

APRIL 8.—**East Looe.**—POST-OFFICE ETC.—The erection of a post office and postmaster's residence, and two dwelling-houses adjoining, at Fore-street, East Looe, for Mr. W. Martin. Plans and specification can be seen at Mr. Martin's house in Looe, or at office of Mr. John Sansom, architect, Liskeard.

APRIL 8.—**Gussage St. Michael's.**—CHURCH.—Rebuilding Gussage St. Michael's Wesleyan Church. For drawings and particulars inquire at the chapel keeper's cottage.

APRIL 8.—**Soothill.**—CLOAKROOM.—West Riding C.C. (Soothill Education Committee) invite tenders for the work as a whole or for the separate trades as required in building a new cloak-room, converting the closets, and asphalting the playgrounds at Gregory-street Council School, Soothill Upper. Plans may be seen, and specifications and quantities obtained, at offices of Mr. William Wood, Divisional Clerk, Station-road, Batley.

APRIL 9.—**Froncysyllte.**—HOUSES AND SHOP.—The erection of two houses and a shop at Froncysyllte, for Mr. Ellis D. Jones, Chirk. Plans and specification can be inspected at office of Mr. E. Vaughan Edmunds, architect and surveyor, Llangollen.

APRIL 9.—**Wardhouse Estate.**—ADDITIONS TO STEADING.—For mason, carpenter, and slater work of additions to steading at Coldhome (Mr. Brander, tenant). Plan and specification can be seen with the tenant.

APRIL 10.—**Cilybebyll, Maesteg, etc.**—SCHOOL WORKS.—Glamorgan C.C. Education Committee invite tenders for:—(1) Erection of a new mixed and infants' school at Rhos, Cilybebyll; (2) erection of a new girls' school at Nantyffyllon, Maesteg; (3) erection of a new infants' school at Tyderwen, Maesteg; (4) erection of a new school at Porthcawl; (5) extensions and alterations at the Girls' County School at Cowbridge; (6) forming new roads, etc., at the new school site at Abertridwr; (7) levelling playground, erection of play-shed, coal-shed, etc., at the Council School at Tondu. Plans, etc., may be seen, and copies of the bill of quantities obtained, for work No. 1, at the Pontardawe Police-station; for works Nos. 2 and 3, at the Maesteg Police-station; and for work No. 5 at the Cowbridge Police-station. Plans, etc., of work No. 4 may be seen, and bills of quantities obtained, at the Bridgend Police-station, as well as specification of work No. 7. Plans of work No. 6 may be seen, and copies of the specification obtained, at the Caerphilly Police-station. The plans or documents for all the works may also be seen or obtained at offices of Mr. W. E. R. Allen, Deputy Clerk of the Glamorgan C.C., Glamorgan County Offices, Westgate-street, Cardiff.

APRIL 10.—**Falkirk.**—ADMINISTRATIVE BLOCK.—For the mason, joiner, plumber, slater, and plasterer's work of proposed administrative block and porter's lodge proposed to be erected at fever hospital. Schedules of quantities may be obtained from, and plans seen with, Mr. David Ronald, Burgh Engineer, Burgh-buildings, Falkirk.

APRIL 12.—**Borah.**—RENOVATION.—The renovation of Borah Wesleyan Chapel. Specification of work can be seen at house of Mr. T. H. Williams, Kemyell, Paul.

APRIL 12.—**Hamilton.**—BATHS AND WASH-HOUSES.—Offers are invited for the various works. Schedules can be obtained at the Burgh Surveyor's Office, Burgh-buildings, on payment of 2*l.* 2s.

APRIL 12.—**Lossiemouth.**—HALLS.—The mason, carpenter, slater, plumber, plaster, and painter works of new halls, to be erected at the High U.F. Church, Lossiemouth. The plans and specifications may be seen with Mr. John Wittet, architect, Elgin.

APRIL 13.—**Bontnewydd.**—ALTERATIONS TO CHAPEL.—For proposed alterations to Bontnewydd C.M. Chapel. Plans, etc., to be seen at the Chapel House. (Mr. Ellis F. White, architect and surveyor, 17, Bridge-street, Carnarvon.)

APRIL 13.—**Bontnewydd.**—ORPHANAGE.—The erection of a new C.M. orphanage at Bontnewydd, near Carnarvon. Plans, etc., to be seen at the "Cartref," Bontnewydd. (Mr. Ellis F. White, architect and surveyor, 17, Bridge-street, Carnarvon.)

APRIL 13.—**Nelson.**—BUSINESS PREMISES.—The erection of four business premises on Commercial-street, Nelson, for Mr. T. Jones. Plans, etc., can be seen, and full particulars obtained, at the office of Messrs. Jones & Howard, architects and surveyors, Station-road, Nelson, Cardiff.

APRIL 13.—**Thornton.**—ALTERATIONS, ETC., TO SCHOOL.—Lancashire Education Committee (Local District Sub-Committee) invite tenders for alterations and repairs at the Council School, Thornton. The plans may be seen, and specifications obtained, at the office of the County Architect, Mr. Henry Littler, 16, Ribblesdale-place, Preston, by payment of a deposit of 1*l.*

APRIL 15.—**Aberaman.**—HOUSES.—For building eighty houses at Aberaman for the Aberaman Workmen's Cottage Building Club. Plans and specifications may be seen at office of Mr. T. Roderick, architect, Ashbrook House, Clifton-street, Aberdare.

APRIL 15.—**Chesterfield.**—ALTERATIONS TO SHOPS.—Chesterfield Corporation invite tenders for executing alterations to the shops on the south side of the covered market. Plans, etc., may be seen at the office of the Borough Surveyor, situate in Salter Gate, where bills of quantities may be obtained on payment of 2*l.* 2s.

APRIL 15.—**Cilderri, Golden Grove.**—HOUSE.—The erection of a house at Cilderri, Golden Grove, for Mr. William Griffiths. Plans and specification can be seen at the office of Mr. Arthur S. Williams, architect and surveyor, 7, King-street, Llandilo.

APRIL 15.—**Kendal.**—ADDITIONS.—Additions and alterations to Nos. 1, 2, and 3, Denmark-terrace, Kendal Green. Plans may be seen, and quantities and specifications obtained, at office of Mr. John F. Curwen, F.S.A., F.R.I.B.A., architect and sanitary engineer, 26, Highgate, Kendal.

APRIL 16.—**Bath.**—WORKS AT BATHS.—Masons and tile fixers, carpenters, painters, plumbers, etc., works, at the several bathing establishments, for the Hot Mineral Baths Committee, of the Bath Corporation. Particulars, etc., from Mr. Alfred J. Taylor, architect, 18, New Bond-street, Carlisle.

APRIL 16.—**Fivemiletown.**—REBUILDING CHURCH.—The rebuilding of Cavanaleck Presbyterian Church, Fivemiletown, according to plans and specification to be seen at the Manse, Cavanaleck.

APRIL 17.—**Chew Magna.**—SCHOOL WORKS.—Somerset C.C. Education Committee invite tenders for improvements to the Chew Magna Council School. Plans, etc., can be seen at the offices of Mr. William F. Bird, Midsomer Norton, from whom further information can be obtained.

APRIL 17.—**Portgordon, etc.**—POLICE-STATIONS.—Banffshire C.C. invite tenders for the mason, carpenter and joiner, slater, plaster, plumber, and painter and glazier works in connexion with the erection of new police-stations at Pontgordon, Cornhill, Aberchirder, and Tomintoul. Plans and specifications can be seen in the hands of Mr. James Christie, jun., architect, Banff, and duplicates thereof may be seen at the various police-stations.

APRIL 18.—**Redcar.**—POLICE-STATION.—The North Riding C.C. of Yorkshire Standing Joint Committee invite tenders for the erection of a proposed new police station, with boundary walls, drill yard, etc., at Redcar. Plans, etc., may be seen, and further information obtained, at the offices of the County Architect, Mr. Walter H. Brierley, 13, Lendal, York.

* APRIL 19.—**Portslade-by-Sea.**—NEW POLICE-STATION.—The East Sussex C.C. invite tenders for new police-station and police residences at Portslade-by-Sea. Further particulars can be seen on referring to an advertisement in this issue.

APRIL 20.—**Dearham.**—SCHOOL WORKS.—Cumberland Education Committee invite tenders for the whole of the works required to be done in the proposed alterations and additions to Dearham Council School. Drawings and specification may be seen at the office of the Clerk of Works, Mr. Joseph Forster, 13, Earl-street, Carlisle.

APRIL 20.—**St. David's.**—SCHOOL ADDITIONS.—The erection of a new laboratory, workshop, and cookery-room at St. David's County School. Plans, etc., may be seen at the office of Mr. Hugh Thomas, architect and surveyor, 9, Victoria-place, Haverfordwest.

* MAY 3.—**London.**—ADMIRALTY EXTENSION.—Commissioners of H.M. Works, etc., invite tenders for Admiralty extension, Block IV. (superstructure). Drawing, specifications, copy of conditions, and form of contract, can be seen on application to Sir Aston Webb, 19, Queen Anne's-gate, S.W. Bills of quantities and form of tender obtainable at H.M. Office of Works. Tenders, addressed to the Secretary, H.M. Office of Works, Storey's-gate, S.W., and endorsed "Tender for Admiralty, Block IV.," to be delivered before 12 o'clock noon on May 3.

NO DATE.—**Batley.**—HOUSES.—Building six houses in Scotchman-lane, Batley. Plans and specifications apply Mr. Andrew Jackson, Howley Park, Batley.

NO DATE.—**Kencnester.**—COTTAGE.—The erection of a cottage at Kenchester, for Mr. John Jacob. Plans, etc., seen, and form of tender obtained, at office of Mr. Ernest G. Davies, architect, 7, Bridge-street, Hereford, and at Monmouth.

NO DATE.—**Leeds.**—CHURCH ENLARGEMENT.—The various works required in the enlargement of Salem Congregational Church, Leeds. Names to Messrs. Danby & Simpson, architects, 75, Albion-street, Leeds.

NO DATE.—**Mirfield.**—SCHOOL WORKS.—The erection and completion of alterations and additions to St. Mary's School, Mirfield. Names to Mr. J. W. Burrows, architect, Mirfield and Birstall.

NO DATE.—**Newport, Mon.**—BUSINESS PREMISES.—The erection of new business premises, offices, etc., in High-street, Newport, for Messrs. Davies & Sons. Plans, etc., may be seen, and bills of quantities obtained, at the offices of Messrs. Habershon, Fawckner & Co., architects, 41, High-street, Newport, and Cardiff.

ENGINEERING, IRON, AND STEEL.

APRIL 8.—**Ayr.**—BRIDGE.—Ayr Corporation invite tenders for the erection of a temporary timber footbridge, about 130 yards long by 8 ft. wide, across the River Ayr, adjoining the Auld Brig. Specifications, etc., may be obtained from, and plans seen with, Mr. John Young, Town Surveyor, Town Buildings, Ayr.

APRIL 10.—**Portsmouth.**—ELECTRIC LIGHTING.—Portsmouth Local Education Authority invite tenders for wiring and fitting up for lighting by electricity the Portsmouth Municipal Institute and Free Library in Park-road. Applications for the specification and drawings (which must be accompanied by a payment of 3*l.* 3s.) must be made to Mr. Alexander Hellard, Town Clerk, Town Hall, Portsmouth. Further information can be obtained on application at the offices of Mr. G. E. Smith, architect, 145, Victoria-road North, Southsea.

APRIL 10.—**Stainland-with-Old-Lindley.**—PIPES.—Stainland-with-Old-Lindley U. D. C. invite tenders (stating price per ton) for the supply and delivery, free at Stainland and Holywell Green Station, L. and Y. Railway, of 225 yards of 12-in. diameter cast-iron socket pipes. Tenders to be delivered to Mr. James H. Walker, Surveyor, Council Offices, Mechanics' Hall, Stainland, Halifax.

APRIL 12.—**Rhondda.**—IRON FENCING.—Rhondda U.D.C. invite tenders for 520 yds. of corrugated iron fencing. Particulars may be had on application to Mr. W. J. Jones, Engineer and Surveyor, Council Offices, Pentre, Rhondda.

APRIL 13.—**Rothwell.**—MAINS.—Rothwell (Northants) U.D.C. (Gas Department) invite tenders for 180 yards 6-in., 800 yards 4-in., and 2,010 yards 3-in. cast-iron pipes and irregulars. Specification and further particulars may be obtained from Mr. A. T. Harris, Manager, Gasworks, Rothwell.

APRIL 15.—**Brighton.**—GROYNES.—Brighton Intercepting and Outfall Sewers Board invite tenders for the construction of five Owens-Case ferro-concrete groynes on the foreshore at Rocdean, near Brighton. The plans may be seen, and copies of the specification obtained, on application to the Consulting Engineers, Messrs. Owens and Case, 15, Tothill-street, Westminster, London, S.W.

APRIL 15.—**Lochore.**—RAILWAY.—North British Railway Company Directors invite offers for the construction of the west portion of this railway, about two miles in length. The drawings and specification can be seen at the office of Messrs. Blyth & Westland, civil engineers, 135, George-street, Edinburgh, and copies of the specification, etc., obtained from Mr. Jno. Cathles, Secretary, 23, Waterloo-place, Edinburgh, on payment of 2*l.* 2s.

APRIL 15.—**Stretford.**—GENERATOR.—Stretford U.D.C. Electricity Committee invite tenders for the following work in connexion with their electrical undertaking:—Contract No. 23.—500 K.W. steam-driven generator. Forms of tender, etc., may be obtained on payment of a deposit of 1*l.* 1s., from Mr. Geo. H. Abrahams, Clerk to the Council, Council Offices, Old Trafford, and further information may be obtained from the Consulting Engineer, Mr. T. L. Miller, M.Inst.C.E., 19, Brazennose-street, Manchester.

APRIL 16.—**London.**—WHEELS AND AXLES.—The Secretary of State for India in Council is prepared to receive tenders for supply of wheels and axles for waggons. The conditions of contract may be obtained on application to the Director-General of Stores, India Office, Whitehall, S.W.

APRIL 16.—**Portsmouth.**—PLANT.—Portsmouth Corporation invite tenders for constructing, completing, and maintaining in thorough repair for six calendar months from the completion thereof, a steam laundry and plant, together with a disinfecting installation complete, at the Infections Diseases Hospital, Milton. On payment of the sum of 2*l.* 2s. a lithographed copy of the bill of quantities, with form of tender, can be obtained from Mr. Alexander Hellard, Town Clerk, Town Hall, Portsmouth.

APRIL 16.—**Rothwell.**—PIPES.—Rothwell U.D.C. invite tenders for the supply of about 35 tons of 6-in. cast-iron water-main pipes, with necessary C.I. specials. Specifications and form of tender may be

obtained on application to Mr. J. Southwart, Council Offices, Rothwell, near Leeds.

APRIL 17.—**Margate.**—STAIRCASE.—Margate T.C. invite tenders for the supply and erection of an iron and steel staircase from the top of the cliffs at the Oval to the landing stage on the foreshore. Plans can be seen, and specification and any further information obtained, on application to Mr. Ernest A. Borg, C.E., Borough Surveyor, Town Hall, Margate.

APRIL 18.—**London.**—PIPES, ETC.—The Great Indian Peninsula Railway Company invite tenders for the supply of the following stores, namely :—Copper pipes, locks, etc. Specifications and forms of tender may be obtained at office of Mr. J. I. Berry, Secretary, Company's Offices, 48, Copthall-avenue, London, E.C., on payment of the fee for the specification, which payment will not be returned.

APRIL 18. — **Swansea.**—LINKS.—The Swansea Harbour Trustees invite tenders for the supply and delivery of 288 forged best hammered scrap dredger bucket links. Further particulars can be obtained on application to the Trustees' Engineer, Mr. A. O. Schenk, M.Inst.C.E., at the Harbour Offices, Swansea.

APRIL 19.—**Loughborough.**—REFUSE DESTRUCTOR.—Loughborough T.C. invite designs and tenders for the provision and construction of a refuse destructor, with steam generator, etc., to be erected at their Sewage Farm, Loughborough. Particulars of requirements may be obtained on application to Mr. A. H. Walker, Assoc.M.Inst.C.E., Borough Surveyor, Town Hall, Loughborough.

NO DATE.—**Frome, Somerset.**—IRONWORK.—Tenders required for erection of saw-tooth roof and supporting pillars. Floor space about 10,000 ft. Apply for plans and specifications to Messrs. Butler & Tanner, Frome, marked "Application for Plans."

MISCELLANEOUS.

★ APRIL 6.—**Saffron Walden.**—IRON STAIRCASES.—The Saffron Walden Guardians invite tenders for supply of two external iron staircases of 35 ft. Tenders to be endorsed "Tender for Staircases," and delivered to the Clerk to the Guardians before April 6.

PAINTING, etc.

APRIL 8. — **Lincoln.** — PAINTING.—Lincoln Corporation Arboretum Committee invite tenders for painting, etc., at the Arboretum and Recreation Ground. Specifications can be seen, and form of tender obtained, at office of Mr. R. A. MacBrair, City Surveyor, Corporation Offices, Lincoln.

APRIL 8.—**Monaghan.**—ROOF REPAIRS.—Monaghan Guardians invite tenders for repair for three years to the roof of the Workhouse buildings. (Mr. Samuel Mitchell, Clerk of Union, Board-room, Workhouse, Monaghan.)

APRIL 8.—**Nottingham.**—PAINTING, ETC.—Nottingham Improvement Committee invite tenders for the following :—Painter's work and ironwork in connexion with the naming and numbering of streets. Specifications, etc., may be obtained on applying to the Building Surveyor, Guildhall, on payment of a deposit of 10s.

APRIL 13.—**Cardiff.**—PAINTING, ETC.—Cardiff Guardians invite tenders for internal painting, papering, etc., at the Cardiff Union Workhouse Hospital, according to specification, a copy of which, together with the form of tender, may be obtained from Mr. Arthur J. Harris, Clerk, Union Offices, Queen's-chambers, Cardiff.

APRIL 16. — **Portsmouth.** — PAINTING, ETC.—Portsmouth Corporation invite tenders for painting, varnishing, etc., seats, railings, etc., on Southsea Beach, Southsea Common, the Canoe Lake Grounds, and the Pembroke Gardens. The specification may be seen and a form of tender obtained at the Borough Engineer's office at the Town Hall.

APRIL 17. — **Belfast.** — PAINTING.—Belfast Library and Technical Instruction Committee invite tenders for painting and colouring the Ballymacarrett Library, Templemore-avenue. Specification may be seen and form of tender obtained in the City Surveyor's Office.

NO DATE. — **Chapel-en-le-Frith.** — DECORATING.—The Trustees of the Wesleyan Chapel, Chapel-en-le-Frith, invite designs and estimates for decorating the interior of the chapel. Further particulars to be obtained from Mr. Fuzzard, Hayfield-road, Chapel-en-le-Frith.

ROADS, SANITARY, AND WATER WORKS.

APRIL 8. — **Ballinamore.** — DRAINAGE, ETC. — The trustees of Ballinamore and Ballyconnell Drainage District invite tenders for drainage, etc., works. The Secretary will be prepared with forms of tender and specifications at the Courthouse, Ballyconnell, on the morning of the meeting, from 9.30 o'clock to 10.30 o'clock.

APRIL 9.—**Heaton Norris.**—ROAD WORKS.—Heaton Norris U.D.C. invite tenders for forming the carriage-way of the following private streets with tarmacadam, together with contingent works :—(1) Derby-road; (2) Queen's-drive. And also for asphalting the footpaths of Queen's-drive. Conditions, etc., may be seen, and forms of tender obtained, upon application to Mr. Walter Banks, A.M.Inst.C.E., Surveyor to the Council.

APRIL 9. — **Southampton.**—STORM-WATER SEWER.—The Corporation invite tenders for the construction of a storm-water sewer on the Polygon Estate. Plans, etc., may be inspected, and bills of quantities and form of tender obtained, at the Borough Engineer's Office, upon production of the Borough Treasurer's receipt for a deposit of 1*l.* 1s.

APRIL 9.—**Tynemouth.**—PAVING, ETC.—For laying a rubble foundation and paving with whinstone chips in Washington-terrace, and also in lane between Upper Queen-street and King-street. Plans, etc., may be seen at the office of Mr. John F. Smillie, Borough Surveyor.

APRIL 9.—**Watford.**—CESSPOOLS.—Watford R.D.C. invite tenders for the supply of team and manual labour in connection with the work of emptying cesspools in the Parish of Chorleywood. Specification and form of tender may be obtained on application to Mr. John Robinson, Inspector of Nuisances, at the offices of the Council, 9, Market-street, Watford.

APRIL 10. — **Brading, etc.**—SEWERS, ETC.—Isle of Wight R.D.C. invite tenders for the following contracts :—Carpenters water-mains, near Brading; Staplers sewer, near Newport; Wootton water-mains. Tenderers can see the plan, specifications, and conditions, and can obtain forms of tender, at the office of the Council's Surveyor, Mr H. B. Cullin, at Brooklands, Wootton Bridge.

APRIL 10. — **Braintree.**—KERB.—Braintree U.D.C. invite tenders for providing and laying about 840 yards 5-in. by 10-in. Norway edge kerb. Specification can be seen, and other particulars obtained, on application to Mr. H. H. Nankivell, Surveyor's Office, Vestry Hall, Braintree.

APRIL 10.—**Co. Cavan.**—SANITARY WORK, ETC.—The Joint Committee of Management of County Cavan Infirmary will receive and consider proposals for :—(No. 1) Providing new drainage, closets, and lavatory for the Infirmary and otherwise improving the sanitary state of the Institution; and (No. 2) repairing roofs, gutters, and down pipes of the Infirmary buildings, doctor's residence, etc., in accordance with the architect's specifications, which may be inspected daily (Sundays excepted) at the Infirmary between the hours of 11 o'clock a.m. and 4 o'clock p.m.

APRIL 10.—**Hythe.**—WATERWORKS.—Hythe Corporation invite tenders for the following works :—Contract No. 2.—Providing and laying about 2,200 yards 8-in. and 2,000 yards 6-in. water main. Contract No. 3.—Construction of a service reservoir on Tolsford Hill, in the Parish of Saltwood. Plans may be seen, and particulars, etc., obtained, on application to Mr. Chris. Jones, Borough Surveyor, Hythe, Kent, on payment of 1*l.* 1s. for each contract.

APRIL 11.—**Beddington.**—SEWER.—Croydon R.D.C. invite tenders for the construction of about 5,000-ft. run of 9-in. sewer, with the necessary manholes, etc., in Sandy-lane, Beddington. Plans and specification may be seen at the office of the Council's Surveyor, Mr. R. M. Chart, F.S.I., and form of tender obtained upon payment of 1*l.*

APRIL 11. — **Southend-on-Sea.** — TAR-MACADAM. — Southend-on-Sea Corporation invite tenders for the supply and laying of tar-macadam on the Western Esplanade, from Palmeira-parade to Grosvenor-road. Plans and specifications may be seen, and bills of quantities obtained, on deposit of cheque for 1*l.* 1s., upon application to Mr. E. J. Elford, M.Inst.M.E., Borough Surveyor.

APRIL 11. — **Tynemouth.** — STREET WORKS.—Tynemouth R.D.C. invite tenders for the completion of street works, back East-avenue, Long Benton, about 800 sq. yds. Plans and specification may be seen at the office of Mr. A. S. Dinning, 21, Ellison-place, Newcastle.

APRIL 13.—**Winsford.**—PAVING PLAYGROUNDS.—Tenders are required for paving two playgrounds at the mixed school Over High-street Council Schools, Winsford. Plans can be seen, and quantities obtained, on application at the office of Mr. H. Beswick, F.R.I.B.A., County Architect, Newgate-street, Chester.

APRIL 15.—**Cheshunt.**—SEWERS.—Cheshunt U.D.C. invite tenders for supplying and laying about 2,000-ft. run of 9-in. pipe sewers in Churchgate-road. Plans, etc., can be seen, and bill of quantities and form of tender obtained, at office of Mr. Reginald H. Jeffes, Assoc.M.Inst.C.E., Engineer and Surveyor to the Council, Council Offices, Cheshunt, on payment of a deposit of 1*l.* 1s.

APRIL 15.—**Narborough and Cosby.**—SEWERAGE WORKS.—For the laying of 450 lineal yards of 9-in. and 12-in. cast-iron pipes, and 2,630 lineal yards of 9-in. and 12-in. stoneware pipes, for the Blaby R.D.C., in connexion with the sewerage of the parishes of Narborough and Cosby. Plans and specification can be seen by appointment only with the Council's Engineer and Surveyor, Mr. J. Turner, Blaby-road, South Wigston. Bill of quantities may be obtained from the engineer on payment of a cheque for 2*l.*

APRIL 15. — **Newport, Isle of Wight.** — WATER MAINS.—Newport, Isle of Wight, T. C. invite tenders for (1) the supply of 300 yards of 4-in. cast-iron water main, and (2) the carting from the Town Quay, the excavation for, and laying of the abovementioned main in Medina-avenue to Shide-road. Plans and specifications of the works and conditions of contract may be seen at office of Mr. T. Ross Pratt, Town Clerk, 19, Quay-street, Newport, I.W.

APRIL 15.—**Southend-on-Sea.**—MAKING-UP STREETS.—Southend-on-Sea Corporation invite tenders for the making-up of streets. Plans, etc., may be seen, and bills of quantities and forms of tender obtained (on deposit of cheque for 1*l.* 1s. in respect of each street), upon application to Mr. E. J. Elford, M.Inst.M.E., Borough Engineer.

APRIL 16. — **Croydon.** — STREET WORKS.—Croydon Corporation invite tenders for the repair of Langdale-road. Plans and specifications may be seen, and forms of tender obtained, on application at the Borough Road Surveyor's Office, Town Hall, Croydon.

APRIL 16. — **Reigate.**—TAR-WASHING ROADS.—Reigate T.C. invites tenders for tar-washing certain sections of the roads in the borough. Further particulars and tender forms may be obtained of Mr. F. T. Clayton, C.E., the Borough Surveyor, Municipal-buildings, Reigate.

APRIL 17.—**Ardrishaig.**—WATER WORKS.—The Mid-Argyll District Committee of the C.C. of Argyll invite tenders for the following contracts in connexion with the Ardrishaig Water Works :—Contract No. 1.—Supplying and laying cast-iron pipes and constructing steam weirs, service reservoir, and filter house. Contract No. 2.—A reservoir on Kildusklandburn. The plans, etc., may be seen at the office of Mr. A. MacEwan, District Clerk, Mid-Argyll District Committee, Lochgilphead, and at the office of the engineers, Messrs Crouch & Hogg, C.E., 14, Blythswood-square, Glasgow. Copies of the specification, etc., may be obtained from the engineers on payment of 1*l.* 1s. for each contract.

APRIL 20. — **Droylsden.** — SEWAGE WORKS.—The U.D.C. of Droylsden invite tenders for :—Contract No. 1.—Alteration of existing tanks, etc. Contract No. 3.—Construction of new percolation beds. Contract No. 4.—Supply of cast-iron pipes, valves, penstocks, etc. Contract No. 5.—Supply and delivery of filtering medium.—Drawings, etc., may be seen, and quantities, form of tender, etc., obtained, on application at the office of Mr. Charles Hall, Surveyor to the Council, 10, Ashton New-road, Droylsden, on payment of a sum of 3*l.* 3s.

APRIL 20.—**Leicester.**—TROUGHS FOR BACTERIA BEDS.—Leicester Sewage Works and Farms Committee invite tenders for the supply of wooden distributing troughs for the bacteria beds at Beaumont Leys Farm. Forms of tender, etc., may be obtained at office of Mr. E. George Mawbey, M.Inst.C.E., Borough Surveyor, Town Hall, Leicester, on payment of a deposit fee of 20s.

APRIL 20.—**Wick.**—SEWERS.—Estimates are wanted by the T.C. of Wick for :—(1) Supplying about 14,000 yards of fireclay sewerage pipes; (2) opening and refilling trenches for sewers and branch drains, supplying about 180 yards of cast-iron pipes, etc., putting in fireclay and iron pipes, and executing other relative works in Upper Pulteneytown. Drawings, etc., may be seen in the Town Clerk's Office, Wick, and in the office of Mr. James Fraser, C.E., Inverness, and schedules will be supplied to contractors by Mr. Fraser.

APRIL 22.—**Carfin.**—SEWERS, ETC.—The District Committee of the Middle Ward of the County of Lanark invite tenders for providing and laying about two miles of fireclay pipe sewers from 9 in. to 12 in. in diameter within the Carfin and Cleekhimin Special Drainage District. Plans may be seen, and copies of the specification, etc., obtained, at the office of Mr. W. L. Douglass, C.E., District Engineer, District Offices, Hamilton, on payment of deposit.

APRIL 24.—**Chiswick.**—ROAD WORKS.—The U.D.C. of Chiswick invite tenders for the making-up of Abinger-road (part of) and for laying surface-water sewers in Abinger-road, Pleydell-avenue, and Grantham-road. Forms of tender and copy of the specification by application to Mr. John Barclay, Surveyor to the Council, at the Town Hall, Chiswick.

NO DATE. — **Dumbarton.** — PIPE TRENCHES. — The Dumbarton Corporation Gas Department invite tenders for the excavating of about 2,200 yards of pipe trenches. Full particulars on application to Mr. Joseph G. M'Geachin, Manager, Gas Works, Dumbarton.

NO DATE.—**Llandebie.**—HEADINGS.—Tenders are invited for driving two hard headings, a total drivage of about 40 yards. Particulars and form of tender may be had on application to the Manager of Emlyn Anthracite Colliery, Llandebie.

STONE, MATERIALS, AND STORES.

APRIL 8. — **Aylesbury.** — GRANITE. — Aylesbury R.D.C. invite tenders for 1,415 tons of granite and 1,000 tons of slag. Particulars can be obtained by forwarding a stamped addressed foolscap envelope to Mr. W. J. Cook, District Surveyor, Aylesbury.

APRIL 8. — **Bath.**—GLAZED PIPES.—Bath R.D.C. invite tenders for the supply and delivery of glazed stoneware socket pipes. Specification and forms of tender can be obtained on application to the Surveyor, Mr. E. H. Sheppard, 3, North Parade, Bath.

APRIL 8. — **Edinburgh.** — STORES.—The Edinburgh and Leith Corporations Gas Commissioners invite tenders for oils and paints, etc. Tender forms and all information can be had on application to the Chief Engineer and Manager at the Gas Works, New-street.

APRIL 8. — **Middleton.** — SETTS, KERBS, ETC. — The Corporation of Middleton invite tenders for setts, flags, sanitary tubes, granite macadam, cast-iron manhole and street grids, waste-water closets, and lime required during the year ended March 31, 1908. Further particulars and form of tender may be obtained from Mr. Welburn, Borough Surveyor, Town Hall, Middleton.

APRIL 8. — **Tonbridge.** — MATERIALS. — Tonbridge R.D.C. invite tenders for the supply of chert, basalt, penlee, rag, and quartzite. Also for haulage and team labour. Forms of tender and further particulars may be had on application to Mr. Frank Harris, engineer and surveyor, Broadway, Southborough, Tunbridge Wells.

APRIL 8. — **Waltham.** — STORES. — Waltham Holy Cross U.D.C. invite tenders for the supply of materials, etc., for the year ending March 31, 1908. Forms of tender may be obtained from Mr. W. T. Streather, Assoc.M.Inst.C.E., Surveyor to the Council, Town Hall, Waltham Abbey.

APRIL 8. — **Waltham.** — WATER CART. — Waltham Holy Cross U.D.C., invite tenders for the supply and delivery of one water cart. Those tendering are invited to send designs and specifications.

APRIL 9. — **Bolsover.** — ROAD MATERIAL, ETC. — Bolsover U.D.C. invite tenders for the supply of slag and limestone for highway purposes for the ensuing year. The Council also invite tenders for carting slag. Forms of tender for the separate carting areas may be had of Mr. W. G. H. Browne, the Council's Surveyor, Bolsover.

APRIL 9.—**Manchester.**—MATERIALS.—Manchester Corporation Tramways Committee invite tenders for the supply of the following :—(*a*) Car-wheel tyres; (*b*) pitch, for paving purposes. Specifications and forms of tender may be obtained on application to Mr. J. M. McElroy, General Manager, Tramways Department, 55, Piccadilly, Manchester.

APRIL 9.—**Rawmarsh.**—WATER PIPES.—Rawmarsh U.D.C. invite tenders for the supply and delivery (free on the site of the works) of about 880 yards of 8-in. strong water pipes (spicket and socket). Further particulars can be obtained on application to the Water Manager, Gas Works, Parkgate.

APRIL 9.—**Riccarton.**—CEMETERY WORKS.—Riccarton P.C. invite tenders :—(1) For the laying out, draining, etc., of extension of Riccarton Cemetery at Kaimshill, near Kilmarnock; (2) for the mason, brick, and digger work; (3) carpenter, joiner, and glazier work; (4) slater and plumber work; and (5) plaster work of new lodge, mortuary, etc. Plans, etc., may be seen, and schedule of quantities obtained, from Messrs. Pearson & Ronaldson, civil engineers and architects, 51, John Finnie-street, Kilmarnock, on payment of 1*l.* sterling for No. 1 schedules, and 10s. sterling for the other schedules.

APRIL 9. — **Southampton.**—STORES.—Southampton Corporation invite tenders for the supply of stores, etc., required in the Borough Engineer's Department, during a period of twelve months. Specifications and forms of tender may be obtained upon application to Mr. J. A. Crowther, Borough Engineer.

APRIL 10.—**Deeside.**—QUARRYING.—For quarrying and breaking stones in the Braemar, Tarland,

Aboyne, Kincardine O'Neill, and Cluny and Midmar sub-divisions of the district. Schedules of quantities may be had on application to Mr. John Milne, District Road Surveyor, Aboyne.

APRIL 10.—**Hull.**—CHALK.—About 250 tons of chalk required, suitable for building sea walls, to be delivered at Paull Point Battery, near Hull. Tenders to be delivered to Brigadier-General in charge of Administration, Headquarters, York. Any further particulars can be obtained on application to the Commanding Royal Engineer, 13, Belle-grove-terrace, Newcastle-on-Tyne.

APRIL 10.—**Radstock.**—ROAD MATERIAL, ETC.—The U.D.C. of Radstock invite tenders for the supply of road material and team labour for general hauling and street watering. Also for steam road rolling. Forms of tender may be obtained from the Council's Surveyor (Mr. G. H. Gibson), Radstock, Bath.

APRIL 10.—**Uckfield.**—ROAD MATERIALS.—The R.D.C. invite tenders for the supply of unbroken hand-picked flints, etc. Further particulars and forms of tender can be obtained on application to Mr. F. Holman, Clerk to the said Council, 86, High-street, Lewes.

APRIL 11.—**Gravesend.**—ROAD MATERIAL.—Gravesend Corporation invite tenders for the supply of road materials. Specification, form of tender, etc., may be obtained on application at the office of the Borough Surveyor, Mr. F. T. Grant, Town Hall, Gravesend.

APRIL 11.—**Great Ouseburn.**—SCAVENGING.—The R.D.C. of Great Ouseburn invite tenders for emptying once a fortnight, and when required by the Inspector of Nuisances, the earth closets, privies, ashpits, and cesspools in Acomb. Mr. Charles Cawood, Whixley, York, will supply further particulars.

APRIL 11.—**Whickham.**—ROAD MATERIALS.—Whickham U.D.C. invite tenders for the supply, free on rail at the nearest station to quarries, of broken slag, limestone, and whinstone, for the twelve months ending March 31, 1908. Forms of tender may be obtained on application to Mr. Thomas Lambert, solicitor, Clerk to the Whickham U.D.C., Town Hall, Gateshead.

APRIL 11.—**Yeardsley-cum-Whaley.**—GRANITE.—The Yeardsley-cum-Whaley U.D.C. invites tenders for 320 tons of 2½-in., and 20 tons of 1½-in., and 15 tons of ¾-in. granite. Tenders, marked "Tender for Granite" (on contractor's own form), to be addressed to Sydney Taylor, solicitor, Buxton, and samples to be forwarded to the Council-room, Whaley Bridge.

APRIL 12.—**Sudbury.**—GRANITE.—West Suffolk C.C. invite tenders for the supply of granite. Particulars, etc., may be obtained on application to Mr. A. Ainsworth Hunt, County Surveyor, Sudbury, Suffolk.

APRIL 13.—**Andover.**—MATERIALS.—The R.D.C. of Andover invite tenders for the supply of road materials. Particulars and forms of tender may be obtained on application to Mr. John Wormald, District Surveyor, Andover.

APRIL 13.—**Lancaster.**—CEMENT.—Lancaster Corporation Streets Committee invite tenders for the supply and delivery in Lancaster of such quantities of English Portland cement as may be ordered up to Jan. 31, 1908. Specification and form of tender may be obtained on application to Mr. John C. Mount, A.M.Inst.C.E., Borough Surveyor, Town Hall, Lancaster.

APRIL 13.—**Leith.**—TIMBER, ETC.—Leith Harbour and Docks Commissioners invite tenders for the supply of timber, iron, and stores. Particulars may be obtained on application at the office of the Superintendent, Tower-place, Leith.

APRIL 15.—**Tenterden.**—ROAD MATERIALS.—Tenterden R.D.C. invite tenders for the supply of quartzite, basalt, or other approved macadam, picked flints, and Kent ragstone. The carriage and steam rolling of the above. Further particulars and forms of tender may be obtained of Mr. W. L. C. Turner, District Surveyor, Tenterden.

APRIL 17.—**Bradford.**—ROAD METAL.—Bradford Corporation invite tenders for the supply of about 20,000 tons of road metal, required for the macadamised roads within the city. Form of tender may be obtained on application at the office of Mr. J. H. Cox, City Surveyor, at the Town Hall.

APRIL 17.—**Houghton-le-Spring.**—ROAD MATERIAL.—The R.D.C. of Houghton-le-Spring invite tenders for supplying machine-broken blast-furnace slag and slag riddlings. Full particulars, with forms of tender, may be obtained from the Surveyor to the Council, Mr. D. Balfour, M.Inst.C.E., Houghton-le-Spring, R.S.O.

APRIL 18.—**Gloucester.**—STONE, ETC.—Gloucester R.D.C. invite tenders for stone and hauling. Forms of tender may be obtained at the offices of the Council, Berkeley House, Berkeley-street, Gloucester, from Mr. F. E. Weaver, the District Surveyor.

APRIL 18.—**Ketton.**—MATERIALS, ETC.—The Rutland C.C. invite tenders for the supply of about 780 tons of broken granite, granite chippings, and screenings. The Council also invite tenders for team labour. Forms of tender, etc., may be obtained from Mr. B. A. Adam, Clerk of the Council, Oakham.

APRIL 20.—**Greenock.**—FURNITURE.—Greenock and District Combination Hospital Board invite tenders for furniture for new Combination Hospital, presently in course of erection at Gateside, Inverkip-road, Greenock, according to specifications by Mr. Alexander Cullen, F.R.I.B.A., architect, Hamilton. Schedules of quantities and forms of tenders can be obtained on application to Mr. Colin MacCulloch, Clerk to the Board, Municipal-buildings, Greenock, on payment of a deposit of 5s. for each schedule.

APRIL 22.—**Dublin.**—STORES.—Dublin and South-Eastern Railway Directors invite tenders for the supply of stores. Specifications, with form of tender, price 6d. each, can be had on application to Mr. M. F. Keogh, Secretary, Secretary's Office, Westland-row, Dublin.

APRIL 29.—**Plomesgate.**—GRANITE.—Plomesgate R.D.C. invite tenders for granite, broken to 1½-in. gauge, and Kent ragstone, broken to 2-in. gauge. Tenders, with samples, to be sent to Mr. T. W. Read, Clerk, at the Workhouse at Wickham Market, Suffolk.

NO DATE.—**Hamilton.**—COUNTERS, ETC.—Hamilton T.C. invite offers for the following for the Hamilton Public Library:—(1) Counters and shelving; (2) window blinds; (3) painter work; (4) grates and ranges. Schedules can be obtained from Mr. Alex. Cullen, architect, Brandon-chambers, Hamilton.

NO DATE.—**Wrotham.**—FENCING.—Tenders are invited for the provision of materials and erecting about 200 rods run of chestnut spile fencing near Wrotham. For particulars, apply to Messrs. Dann & Lucas, Land Agents, Dartford, Kent.

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale.
*DEALS, BATTENS, ETC.—Great Hall, Winchester House, Old Broad-street, E.C.	Churchill & Sims	April 10
*FREEHOLD BUILDING LAND, STAMFORD HILL AND UPPER CLAPTON—At the Mart	F. W. Hobson	April 17
*BUILDER'S PLANT, ETC.—At Brief-street, Burton-road, Brixton, S.W.	Fuller, Horsey, Sons, & Cassell	April 18
*MANUFACTURING PREMISES AND BUILDING SITE, LATIMER-RD., W.—At the Mart	H. Collier & Madge	April 22
*SAW-MILL MACHINERY, ETC.—At 145, Grosvenor-road, S.W.	Fuller, Horsey, Sons, & Cassell	April 23 & 24
*FREEHOLD PROPERTY, FINSBURY, E.C.—At the Mart	Douglas Young & Co.	April 24
*103 AND 103A, OXFORD-STREET, W.—At the Mart	May & Rowden	April 26
*FREEHOLD BUILDING LAND, TOOTING COMMON—At the Mart	Hampton & Sons	April 30
*FREEHOLD PROPERTY, SYDENHAM HILL—At the Mart	David Burnett & Co.	May 1
*FREEHOLD BUILDING LAND, CROYDON—At the Mart	David Burnett & Co.	do.
*FREEHOLD BUILDING ESTATE, TOTTENHAM—At the Mart	Douglas Young & Co.	May 8
*FREEHOLD BUILDING SITE, CITY OF LONDON—At the Mart	Farebrother, Ellis, Egerton, Breach, Galsworthy, & Co.	May 14
*FREEHOLD BUILDING ESTATE, CLAPHAM COMMON—At the Mart	Thurgood & Martin	June 20

PATENTS.—*Continued from page* 430.

above it. The said cistern can be embedded in the wall, say, to about half of its extent from rear to front, so as to leave sufficient extent projecting for an opening and a lid or cover to allow of access to the interior of the cistern. The opening left for the recess to the interior of the cistern can be closed by any suitable cover, such, for instance, as one of similar material to the cistern pan and other parts of the closet, slop sink, or the like, and this opening instead of being in the top may be in the upper part of the front or back, or partly in the top and partly in the front or back.

22,451 of 1906.—A. BRIGGS: *Flooring Cramp.*

This relates to a flooring cramp, comprising a fixed body, a movable ram having two racks formed thereon, a pawl connected to a hand lever and engaging one of said racks for the advancement of the ram, and a pair of auxiliary pawls so adjusted that one comes into action slightly in advance of the other, and capable of engaging the other of said racks for preventing reversal of the movement of the ram.

24,463 of 1906.—J. LEVICK: *Attachment of Hinged Seats and Lids or Covers to Earthenware Water-Closet and analogous Basins.*

This relates to a fitting for connecting hinged seats and lids to earthenware water-closet and commode basins having integral lugs to which such fittings are attached, said fitting comprising a bracket extending rearwardly beyond a lug, a base for engagement with a corresponding seating or recess in the said lug, and a solid or integral bolt stem adapted to be passed through a bolt-hole in the said lug.

25,684 of 1906.—J. BARR: *A Self-closing Air-valve or Ventilator.*

This relates to a self-closing air-valve or ventilator, wherein the plate with the hole or air inlet and the valve for closing same are made in two separate parts and are connected by a pivot riveted to the plate, on which pivot the valve swings and is secured by a washer and split-pin, the link which engages the lever or stem of said valve being also in one piece.

284 of 1907.—E. P. SPERRY: *Window Operating and Locking Mechanism.*

This relates to a window operating and locking mechanism, and consists in the combination of a lever mechanism provided with means for connecting it with a window-sash, locking mechanism adapted to lock such lever mechanism, and thereby the window-sash, in adjusted positions as desired, and an operating member provided with means for connecting it with the lever mechanism and movable into position to enclose and shield the locking mechanism.

5,494 of 1906.—T. CHILTON: *Picks, Axes, Adzes, and the like.*

This relates to picks and the like having detachable ends, and consists of means whereby the tools and blades are detachably secured in position by their tenon-shaped end engaging with tapered dovetailed recesses in the ends of the ferrule or head of the pick.

6,542 of 1906.—C. J. LOMAX: *Construction of Spigot and Socket Watertight Joints for Sanitary and other Pipes.*

This relates to the method of making a joint between spigot and socket pipes, which consists in running a cement or the like ring in an annular recess in such joint, testing the tightness of said ring by means of fluid under pressure in a contiguous annular recess and then running a cement or like ring in the recess which has previously been used for testing.

10,717 of 1906.—T. DUXBURY: *Machine for Making and Pressing Fire Lighters, Briquettes, Bricks, Tiles, and other Goods.*

This relates to a machine for making fire lighters, bricks, or the like, comprising in combination side castings having projections forming tables, end-pieces, grooves in such side castings, and movable plates adapted to rest in said grooves whereby an easily renewable die is provided.

2,017 of 1907.—K. A. R. KELLER: *Water-heating Apparatus.*

This relates to a water-heating apparatus, and consists in the combination of a number of double sides, one of which serves as an inlet for the water to be heated, a double top communicating with each of said double sides, and having an outlet for the heating water, and a number of pipes to each of the double sides, connecting the lower and upper portions of the latter and extending across the space enclosed by the double sides and the said top, said spaces constituting the fire-chamber.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

March 15.—By SPELLMAN (at Norwich).

Norwich, Norfolk.—71, Newmarket-rd., f., y.r. 55*l.*	£1,000

March 19.—By SEDGWICK, SON, & WEALL (at Watford).

Watford, Herts.—31 and 33, St. John's-rd. (s.), f., y.r. 68*l.*	825
Albert-rd., plot of freehold building land	175

March 22.—By HARRY BALL (at Bedford).

Bedford.—2, 4, 6, and 8, Offa-rd., f. y.r. 56*l.*	1,040
25, Cobden-st., f., y.r. 9*l.* 2s.	170

March 25.—By DAVID J. CHATTELL & SONS.

Brixton.—Trinity-sq., l.g. rents 86*l.* 8s., u.t. 21 yrs., g.r. 5*l.* 16s.	855
Bermondsey.—82 to 90 (even), Alcot-rd., u.t. 22¾ yrs., g.r. 21*l.* 13s. 4d., y.r. 138*l.*	950
Dunton Green, Kent.—"Mariposa" and 2¼ acres, f., p.	1,250

By HOLLIDAY & STANGER.

Camberwell.—Grosvenor-ter., f.g. rents 21*l.* 15s., reversion in 49 yrs.	525
Streatham.—52, Stanthorpe-rd., u.t. 90 yrs., g.r. 10*l.*, p.	520

By OSBORN & MERCER.

Maida Vale.—No. 42, u.t. 13½ yrs., g.r. 1*l.* 13s. 4d., y.r. 55*l.*	600

March 26.—By H. J. BROMLEY.

Norwood.—86 and 88, Ladas-rd., u.t. 92 yrs., g.r. 10*l.*, w.r. 55*l.*	330
Forest Hill.—64, Devonshire-rd., u.t. 57 yrs., g.r. 6*l.*, y.r. 30*l.*	150

By C. RAWLEY CROSS & CO.

Acton.—17, Mansell-rd., u.t. 70½ yrs, g.r. 6*l.*; y.r. 32*l.*	320

By HAMPTON & SONS.

Regent's Park.—27, Belsize-pk.-gdns, u.t. 45 yrs., g.r. 30*l.*, p	460

By C. W. DAVIES & SON.

Holloway.—116, Tollington-rd., u.t 36 yrs., g.r. 6*l.* 10s., y.r. 40*l.* £250
118, Tollington-rd., u.t. 36 yrs., g.r. 6*l.* 10s., y.r. 38*l.* 250
120, Tollington-rd., u.t. 36 yrs., g.r. 6*l.* 10s., y.r. 38*l.* 235
Caledonion-rd.—16, Blundell-st., u.t. 45 yrs., g.r. 8*l.*, w.r. 58*l.* 215
Crouch End.—68, Palace-rd., u t. 70 yrs., g.r. 10*l.*, y.r. 44*l.* 300

By ED. HUGH HENRY.

Wandsworth.—24, Vardens-rd, f., y.r. 48*l.* 650

By F. WARMAN.

Stamford-hill.—48, Daleview-rd., u.t. 63 yrs., g.r. 5*l.* 10s., e.r. 27*l.* 220
Stoke Newington.—10, Winston-rd., u.t. 54 yrs., g.r. 5*l.* 10s., e.r. 34*l.* 220

By BOYTON, SONS, & TREVOR (at Walham Green).

Fulham.—26, Anselm-rd., u.t. 65 yrs., g.r. 4*l.*, w.r. 36*l.* 245
Shepherd's Bush.—8, Rayleigh-rd., u.t. 62 yrs., g.r. 10*l.*, e.r. 55*l.*, p. 330

March 27.—By FRANK E. WIDDOWSON.

Walham Green.—27, Barclay-rd., u.t. 82 yrs., g.r. 7*l.* 10s., w.r. 113*l.* 400

By JOHN BOTT & SONS.

Norwood.—37, Westow-hill (s.), u.t. 57 yrs., g.r. 55*l.*, y.r. 141*l.* 510

By WILLIAM HOLLIS.

Finchley.—"Lyndhurst," Church End, f., e.r. 75*l.*, p. 800
Kilburn.—74, Tennyson-rd, u.t. 80 yrs., g.r. 6*l.*, w.r. 46*l.* 350
Finchley.—6, The Hawthorns, u.t. 62½ yrs., g.r. 8*l.* 8s., e.r 65*l.*, p. 575
"Montrose," Church End, u.t. 80 yrs., g.r. 10*l.* 10s., y.r. 90*l.* 1,200

By WALTER SIMMONDS.

Camberwell.—36, Kitson-rd., u.t. 51 yrs., g.r. 6*l.* 2s., w.r. 46*l.* 350

By ROBERT TIDEY & SON.

Hoxton.—Branch-pl., f.g.r. 25*l.* 4s., reversion in 11½ yrs. 2,500

By MADDISON, MILES, & MADDISON (at Great Yarmouth).

Great Ormesby, Norfolk.—Freehold house and market gdn., 3 a. 1 r. 0 p., p. 775

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; l.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold, p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; gr. for grove; b.h. beerhouse; p.h. for public-house; o. for office; s. for shops; ct. for court.

MEETINGS.

SATURDAY, APRIL 6.

The Building Trades Exhibition, Olympia.—Opening by the Right Hon. the Lord Mayor. 12 noon.

MONDAY, APRIL 8.

Royal Institute of British Architects.—Mr. Stanley Hamp on "Hotels." 8 p.m.

Bristol Society of Architects.—President's Conversazione and General Meeting.

Society of Engineers.—7.30 p.m

Surveyors' Institution.—Mr. W. Vaux Graham and Mr Harold F. Bidder on "Underground Water A discussion of certain recent enactments affecting Water Rights." 8 p.m.

Royal Sanitary Institute.—Mr. A. Saxon Snell on "Ventilation, Warming and Lighting." 7 p.m. Water Supply Demonstration at 6 p.m.

Society of Engineers.—Mr. B. H. Thwaite, Assoc. M.Inst.C.E., and Mr. R. F. Thorp, M.Inst.C.E., on "The Renard and Sourcouf Road-Train System." 7.30 p.m.

TUESDAY, APRIL 9.

Royal Institution.—Professor G. H. Bryan, M.A., on "Wings and Aeroplanes."—I. 3 p.m.

Institution of Civil Engineers.—Papers to be further discussed—(1) "The Application of Hydro-Electro Power to Slate Mining," by Mr. Moses Kellow, Assoc.M.Inst.C.E.; and (2) "Electrically-Driven Winding Gear and the Supply of Power to Mines," by Mr. Arthur Henry Preece, M.Inst.C.E. 8 p.m.

Junior Institution of Engineers (Westminster Palace Hotel).—Paper on "The Relation of Surveying to Engineering," by Mr. G. P. Knowles, Assoc.M.Inst.C.E., F.S.I. 8 p.m.

WEDNESDAY, APRIL 10.

Royal Sanitary Institute (Lectures for Sanitary Officers).—Mr. J. Wright Clarke on "Details of Plumbers' Work." Inspection in district of Islington at 2 p.m.

THURSDAY, APRIL 11.

Royal Institution.—Professor H. A. Miers, M.A., on "The Birth and Affinities of Crystals"—I. 3 p.m.

FRIDAY, APRIL 12.

Architectural Association.—Mr. J. A. Marshall on "Westminster Cathedral." 7.30 p.m.

Royal Institution.—Professor A. H. Church, M.A., on "Conservation of Historic Buildings and Frescoes," with Experimental Illustrations. 9 p.m.

Royal Sanitary Institute.—Mr. W. C. Tyndale on "House Drainage." 7 p.m.

Institution of Civil Engineers (Students' Meeting).—"An Engineer's Visit to Japan and Canada," by Mr. R. W. Allen, Assoc.M Inst.C.E. 8 p.m.

Institution of Mechanical Engineers.—An Extra Meeting. The discussion will be continued on paper on "Petrol Motor-Omnibuses," by Mr. W. Worby Beaumont. 8 p.m.

SATURDAY, APRIL 13.

Royal Institution.—Professor Silvanus P. Thompson, B.A., on "Studies in Magnetism."—I. 3 p.m.

Royal Sanitary Institute (Demonstrations for Sanitary Officers).—Inspection at the Sewage Works, Sutton. 3 p.m.

TERMS OF SUBSCRIPTION.

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PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£	s.	d.	
Hard Stocks	1	8	0	per 1000 alongside, in river.
Rough Stocks and Grizzles	1	6	0	" " "
Picked Stocks for Facings	2	10	0	" delivered.
Flettons	1	8	0	" at railway depôt.
Red Wire Cuts	1	14	0	" " "
Best Fareham Red	3	12	0	" " "
Best Red Pressed Ruabon Facing	5	0	0	" " "
Best Blue Pressed Staffordshire	3	15	0	" " "
Do. Bullnose	4	0	0	" " "
Best Stourbridge Fire Bricks	3	14	0	" " "
GLAZED BRICKS.				
Best White and Ivory Glazed Stretchers	12	0	0	" " "
Headers	11	0	0	" " "
Quoins, Bullnose, and Flats	16	0	0	" " "
Double Stretchers	19	0	0	" " "
Double Headers	16	0	0	" " "
One Side and two Ends	19	0	0	" " "
Two Sides and one End	20	0	0	" " "
Splays, Chamferred, Squints	20	0	0	" " "
Best Dipped Salt Glazed Stretchers, and Header	12	0	0	" " "
Quoins, Bullnose, and Flats	14	0	0	" " "
Double Stretchers	15	0	0	" " "
Double Headers	14	0	0	" " "
One Side and two Ends	15	0	0	" " "
Two Sides and one End	15	0	0	" " "
Splays, Chamferred, Squints	14	0	0	" " "
Second Quality White and Dipped Salt Glazed	2	0	0	" less than best.

	s.	d.	
Thames and Pit Sand	7	0	per yard, delivered.
Thames Ballast	5	6	" "
Best Portland Cement	28	0	per ton, "
Best Ground Blue Lias Lime	19	0	" "

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 11s. 6d. per yard, delivered.
Stourbridge Fireclay in sacks 27s. 0d. per ton at rly. dpt.

STONE.

	s.	d.	
BATH STONE—delivered on road waggons, Paddington Depôt	1	6½	per ft. cube.
Do. do. delivered on road waggons, Nine Elms Depôt	1	8½	" "
PORTLAND STONE (20 ft. average)—Brown Whitbed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2	1	" "
White Basebed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2	2½	" "

	s.	d.	
Ancaster in blocks	1	10	per ft. cube, deld. rly. depôt.
Beer "	1	6	" "
Greenshill "	1	10	" "
Darley Dale in blocks	2	4	" "
Red Corsehill "	2	2	" "
Closeburn Red Freestone	2	0	" "
Red Mansfield "	2	4	" "
YORK STONE—*Robin Hood Quality.*			
Scappled random blocks.	2	10	" "
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2	3	per ft. super., "
6 in. rubbed two sides ditto, ditto	2	6	" "
3 in. sawn two sides slabs (random sizes)	0	11½	" "
2 in. to 2½ in. sawn one side slabs (random sizes)	0	7½	" "
1½ in. to 2 in. ditto, ditto	0	6	" "
HARD YORK—			
Scappled random blocks.	3	0	per ft. cube, "
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2	8	per ft. super. "
6 in. rubbed two sides ditto	3	0	" "
3 in. sawn two sides slabs (random sizes)	1	2	" "
2 in. self-faced random flags	0	5	" "

SLATES.

In. In.	£	s.	d.	
20×10 best blue Bangor	13	2	6	per 1000 of 1200 at r. d.
20×12 " "	13	17	6	" "
20×10 first quality "	13	0	0	" "
20×12 " "	13	15	0	" "
16×8 " "	7	5	0	" "
20×10 best blue Portmadoc	12	12	6	" "
16×8 " "	6	12	6	" "
20×10 best Eureka unfading green	15	17	6	" "
20×12 " "	18	7	6	" "
18×10 " "	13	5	0	"
16×8 " "	10	5	0	" "
20×10 permanent green	11	12	6	" "
18×10 " "	9	12	6	" "
16×8 " "	6	12	6	" "

TILES.

	s.	d.	
Best plain red roofing tiles	42	0	per 1000 at rly. depôt.
Hip and Valley tiles	3	7	per doz. "
Best Broseley tiles	50	0	per 1000 "
Do. Ornamental tiles	52	6	" "
Hip and Valley tiles	4	0	per doz. "
Best Ruabon red, brown, or brindled do. (Edwards)	57	6	" "
Do. Ornamental do.	60	0	" "
Hip tiles	4	0	per doz. "
Valley tiles	3	0	" "
Best Red or Mottled Staffordshire do. (Peakes)	51	9	per 1000 "
Do. Ornamental do.	54	6	" "
Hip tiles	4	1	per doz. "
Valley tiles	3	8	" "
Best "Rosemary" brand plain tiles	48	0	per 1000 "
Best Ornamental tiles	50	0	" "
Hip tiles	4	0	per doz. "
Valley tiles	3	8	" "
Best "Hartshill" brand plain tiles, sand-faced	50	0	per 1000 "
Do. pressed	47	6	" "
Do. Ornamental do.	50	0	" "
Hip tiles	4	0	per doz. "
Valley tiles	3	6	" "

WOOD.

BUILDING WOOD.	At per standard. £	s.	d.	£	s.	d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	13	10	0	... 15	0	0
Deals: best 3 by 9	13	0	0	... 14	0	0
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	11	0	0	... 12	0	0
Battens: best 2½ by 6 and 3 by 6	0	10	0	less than 7 in. and 8 in.		
Deals: seconds	1	0	0	less thn best.		
Battens: seconds	0	10	0	" "		
2 in. by 4 in. and 2 in. by 6 in.	9	0	0	... 10	0	0
2 in. by 4½ in. and 2 in. by 5 in.	8	10	0	... 9	10	0
Foreign Sawn Boards—						
1 in. and 1¼ in. by 7 in.	0	10	0	more than battens.		
¾ in.	1	0	0	"		
	At per load of 50 ft.					
Fir timber: best middling Danzig or Memel (average specification)	4	10	0	... 5	0	0
Seconds	4	0	0	... 4	10	0
Small timber (8 in. to 10 in.)	3	12	6	... 3	15	0
Small timber (6 in. to 8 in.)	3	0	0	... 3	10	0
Swedish balks	2	10	0	... 2	0	0
Pitch-pine timber (30 ft. average)	4	0	0	... 4	15	0
JOINERS' WOOD.	At per standard.					
White Sea: first yellow deals, 3 in. by 11 in.	24	0	0	... 25	0	0
3 in. by 9 in.	22	0	0	... 23	0	0
Battens, 2½ in. and 3 in. by 7 in.	16	10	0	... 18	0	0
Second yellow deals, 3 in. by 1 in.	18	10	0	... 20	0	0
" " 3 in. by 9 in.	17	10	0	... 19	0	0
Battens, 2½ in. and 3 in. by 7 in.	13	10	0	... 14	10	0
Third yellow deals, 3 in. by 11 in. and 9 in.	13	10	0	... 15	0	0
Battens, 2½ in. and 3 in. by 7 in.	11	0	0	... 12	0	0
Petersburg first yellow deals, 3 in. by 11 in.	21	0	0	... 22	10	0
Do. 3 in. by 9 in.	18	0	0	... 19	10	0
Battens	13	10	0	... 15	0	0
Second yellow deals, 3 in. by 11 in.	16	0	0	... 17	0	0
Do. 3 in. by 9 in.	14	10	0	... 16	0	0
Battens	11	0	0	... 12	10	0
Third yellow deals, 3 in. by 11 in.	13	0	0	... 14	0	0
Do. 3 in. by 9 in.	12	10	0	... 14	0	0
Battens	10	0	0	... 11	0	0
White Sea and Petersburg—						
First white deals, 3 in. by 11 in.	14	10	0	... 15	10	0
" " 3 in. by 9 in.	13	10	0	... 14	10	0
Battens	11	0	0	... 12	0	0
Second white deals, 3 in. by 11 in.	13	10	0	... 14	10	0
" " 3 in. by 9 in.	12	10	0	... 13	10	0
" " battens	10	0	0	... 11	0	0
Pitch-pine: deals	18	0	0	... 21	0	0
Under 2 in. thick extra	0	10	0	... 1	0	0
Yellow Pine—First, regular sizes	44	0	0	upwards.		
Oddments	32	0	0	"		
Seconds, regular sizes	33	0	0	"		
Yellow Pine oddments	28	0	0	"		
Kauri Pine—Planks, per ft. cube	0	3	6	... 0	5	0
Danzig and Stettin Oak Logs—						
Large, per ft. cube	0	3	0	... 0	3	6
Small " "	0	2	6	... 0	2	9
Wainscot Oak Logs, per ft. cube	0	5	6	... 0	6	0
Dry Wainscot Oak, per ft. sup. as inch	0	0	8½	... 0	0	9½
¾ in. do. do	0	0	7	...	—	
Dry Mahogany—Honduras, Tabasco, per ft. super. as inch	0	0	9	... 0	1	0
Selected, Figury, per ft. super. as inch	0	1	6	... 0	2	6
Dry Walnut, American, per ft. super. as inch	0	0	10	... 0	1	0
Teak, per load	17	0	0	... 22	0	0
American Whitewood Planks, per ft. cube	0	4	0	... 0	5	0
Prepared Flooring, etc.—	Per square.					
1 in. by 7 in. yellow, planed and shot	0	13	6	... 0	17	6
1 in. by 7 in. yellow, planed and matched	0	14	0	... 0	18	0

WOOD (*continued*).

JOINERS' WOOD—(*continued*).

Prepared Flooring, etc. (*continued*)—	Per square. £ s. d.		£ s. d.
1¼ in. by 7 in. yellow, planed and matched	0 16 0	...	1 0 0
1 in. by 7 in. white, planed and shot	0 12 0	...	0 14 6
1 in. by 7 in. white, planed and matched	0 12 6	...	0 15 0
1¼ in. by 7 in. white, planed and matched	0 15	...	0 16 6
⅜ in. by 7 in. yellow, matched and beaded or V-jointed brds.	0 11 0	...	0 13 6
1 in. by 7 in. „ „	0 14 0	...	0 18 0
⅜ in. by 7 in. white „ „	0 10 0	...	0 11 6
1 in. by 7 in. „ „ „	0 12 9	...	0 15 0

6 in. at 6d. to 9d. per square less than 7 in.

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton. £ s. d.		£ s. d.
Rolled Steel Joists, ordinary sections	7 7 6	...	7 15 0
Compound Girders, ordinary sections	9 10 0	...	10 10 0
Steel Compound Stanchions	12 5 0	...	13 5 0
Angles, Tees, and Channels, ordinary sections	9 5 0	...	10 5 0
Flitch Plates	9 5 0	...	10 5 0
Cast Iron Columns and Stanchions including ordinary patterns	8 0 0	...	9 0 0

METALS.

	Per ton, in London. £ s. d.		£ s. d.
IRON—			
Common Bars	8 10 0	...	9 0 0
Staffordshire Crown Bars, good merchant quality	9 5 0	...	9 15 0
Staffordshire "Marked Bars"	11 0 0	...	—
Mild Steel Bars	9 10 0	...	9 15 0
Hoop Iron, basis price	9 15 0	...	10 0 0
„ „ Galvanised	17 10 0	...	—
("And upwards, according to size and gauge.)			
Sheet Iron Black—			
Ordinary sizes to 20 g.	10 0 0	...	—
„ „ 24 g.	11 0 0	...	—
„ „ 26 g.	12 10 0	...	—
Sheet Iron, Galvanised, flat, ordinary quality—			
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	16 0 0	...	—
Ordinary sizes to 22 g. and 24 g.	16 10 0	...	—
„ „ 26 g.	17 0 0	...	—
Sheet Iron, Galvanised, flat, best quality—			
Ordinary sizes to 20 g.	19 0 0	...	—
„ „ 22 g. and 24 g.	19 10 0	...	—
„ „ 26 g.	21 0 0	...	—
Galvanised Corrugated Sheets—			
Ordinary sizes 6 ft. to 8 ft. 20 g.	16 0 0	...	—
„ „ 22 g. and 24 g.	16 5 0	...	—
„ „ 26 g.	17 10 0	...	—
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker	13 0 0	...	—
Best Soft Steel Sheets, 22 g. & 24 g.	14 0 0	...	—
„ „ „ 26 g.	16 0 0	...	—
Cut Nails, 3 in. to 6 in.	10 15 0	...	11 5 0

(Under 3 in., usual trade extras.)

LEAD, &c.

	Per ton, in London. £ s. d.		£ s. d.
LEAD—Sheet, English, 3lb. and up.	22 12 6	...	—
Pipe in coils	23 2 6	...	—
Soil pipe	25 2 6	...	—
Compo pipe	26 2 6	...	—
ZINC—Sheet—			
Vieille Montagne ...ton	34 5 0	...	—
Silesian	34 0 0	...	—
COPPER—			
Strong Sheet ...per lb.	0 1 4	...	—
Thin „	0 1 5	...	—
Copper nails „	0 1 3	...	—
BRASS—			
Strong Sheet „	0 1 2	...	—
Thin „	0 1 3	...	—
TIN—English Ingots „	0 1 11	...	—
SOLDER—Plumbers' „	0 0 9	...	—
Tinmen's „	0 0 11½	...	—
Blowpipe „	0 1 1	...	—

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES.

15 oz. thirds	2¼d. per ft. delivered.
„ fourths	1⅞d. „ „
21 oz. thirds	3¼d. „ „
„ fourths	2½d. „ „
26 oz. thirds	4¼d. „ „
„ fourths	3¼d. „ „
32 oz. thirds	5d. „ „
„ fourths	4¼d. „ „
Fluted Sheet, 15 oz.	3¼d. „ „
„ 21 oz.	4¼d. „ „

ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES.

⅛ Hartley's	2¼d. per ft. delivered.
¼ „	2¼d. „ „
½ „	3d. „ „
Figured and Oxford Rolled "Oceanic" Glass, white ...	4d. „ „
Do. „ tinted ...	5¼d. „ „

OILS, &c.

		£ s. d.
Raw Linseed Oil in pipes	per gallon	0 1 11
„ „ „ in barrels	„	0 2 0
„ „ „ in drums	„	0 2 2
Boiled „ „ in pipes	„	0 2 1
„ „ „ in barrels	„	0 2 2
„ „ „ in drums	„	0 2 4
Turpentine in barrels	„	0 4 4
„ in drums	„	0 4 7
Genuine Ground English White Lead	per ton	26 0 0
Red Lead, Dry	„	24 10 0
Best Linseed Oil Putty	per cwt.	0 7 0
Stockholm Tar	per barrel	1 12 0

VARNISHES, &c.

	Per gallon. £ s. d.
Fine Pale Oak Varnish	0 8 0
Pale Copal Oak	0 10 6
Superfine Pale Elastic Oak	0 12 6
Fine Extra Hard Church Oak	0 10 0

VARNISHES, &c. (*continued*).

	Per gallon. £ s. d.
Superfine Hard-drying Oak, for seats of Churches	0 14 0
Fine Elastic Carriage	0 12 6
Superfine Pale Elastic Carriage	0 16 0
Fine Pale Maple	0 16 0
Finest Pale Durable Copal	0 18 0
Extra Pale French Oil	1 1 0
Eggshell Flatting Varnish	0 18 0
White Copal Enamel	1 4 0
Extra Pale Paper	0 12 0
Best Japan Gold Size	0 10 6
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 8 6
Berlin Black	0 16 0
Knotting	0 10 0
French and Brush Polish	0 10 0

TO CORRESPONDENTS

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications; and the Editor cannot be responsible for drawings, photographs, manuscripts, or other documents, or for models or samples, sent to or left at this office, unless he has specially asked for them.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED

All communications must be authenticated by the name and address of the sender whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the article or drawing, when received, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance. The Editor cannot undertake to read and consider articles offered for acceptance unless they are type-written.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays.* [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

BRADFORD.—For building a circular brick chimney, 50 ft. high, at the Union Hospital, Horton-lane, for the Guardians. Mr. F. Holland, engineer and architect, 11, Parkinson's-chambers, Hustlergate, Bradford :—

C. Booth & Son, Bradford* £626

BRIGHTLINGSEA (Essex).—For making up road in Park district :—

A. E. Farr	£750 0 0	H. Lord	£190 0
J. C. Trueman	320 0 0	E. Blyth, Waterside, Brightlingsea*	175 10
W. J. Nicols	220 13 8		

BROMYARD.—For laying a 3-in. water main in the New-road, for the Urban District Council. Mr. J. D. Barrs, Surveyor :—

A. E. Pettifer	£53 7 6	A. Amiss, Shenford-street, Bromyard*	£31 10
A. Newbold	36 0 0		

CAERPHILLY.—For alterations and additions to the Rose and Castle Inn, for Messrs. Wm. Hancock & Co., Ltd. Messrs. Swalwell & Havard, architects and surveyors, Steam Packet Chambers, Dock-street, Newport, Mon. :—

C. H. Reed	£668 0	J. H. Leadbeter	£570 0
R. Moon	650 0	E. R. Evans	570 0
E. D. W. Evans	640 3	G. F. Leadbeter	547 10
E. G. Clarke	618 10	T. F. Howells, Cardiff*	530 0
D. Parfitt	590 0	F. W. Powles	529 0
J. Jenkins, Ltd.	583 0		

COLCHESTER.—For a bungalow in Mile End-road, Colchester. Mr. W. Scargill, architect, 60, Albert-street, Colchester. Quantities by Mr. R. Horne, Colchester :—

T. J. Ward	£578 18	A. Diss	£448 0
Scott	491 0	Cook	436 0
R. Beaumont	460 0	G. Appleton	425 10

CONSETT.—For erecting new stable, warehouse, etc., at Back Newmarket-street, for Mr. J. J. Montrey. Mr. J. J. Eltringham, architect and surveyor, Hawthorn-terrace, Blackhill :—

Elleringham, Ltd.	£142 0	W. Jackson, Leadgate, Co. Durham*	£124 10
T. Gallacher	128 0		

ERDINGTON.—For erecting west wing to the No. 2 North Pavilion at the Workhouse, for Aston Guardians. Messrs. C. Whitwell & Son, architects, 3, Newhall-street, Birmingham :—

W. Lee & Son, Avenue-road, Aston £3,654

GODALMING.—For the erection of a new Council School at Godalming, for Surrey Education Committee. Messrs. A. Wickham Jarvis, A.R.I.B.A., Frank A. Richards, M.A., Architects to the Surrey Education Committee, 36, Victoria-street, London, S.W. :—

H. G. Bunning	£6,182 0 0	Goddard & Sons	£5,414 0 0
Tribe & Robinson	5,885 0 0	G. Kemp	5,283 0 0
F. Milton	5 730 0 0	Martin, Wells, & Co.	5,280 0 0
Mitchell Bros.	5,605 0 0	Wakeham Bros*	5,195 0 0
J. & M. Patrick	5,590 0 0		
D. Fry	5,583 0 0		
T. J. Hawkins & Co.	5,578 19 3		

GREAT YARMOUTH.—New bootroom and men's offices, for "Palmers." Messrs. G. Baines & Son, architects, 5, Clement's-inn, Strand, London, W.C. :—

J. Leggett, 39, Dene-side, Great Yarmouth*. £474 6 11

GREAT YARMOUTH.—Mantle showroom, workrooms, etc., for "Palmers." Messrs. G. Baines & Son, architects, 5, Clement's-inn, Strand, London, W.C. :—

J. Leggett, 39, Dene-side, Great Yarmouth* .. £2,310

GREAT YARMOUTH.—For decorative work King-street Congregational Church. Messrs. G. Baines & Son, architects, 5, Clement's-inn, Strand, W.C. :—

J. E. Dyson	£388 18	J. T. Goffin, 58, King-st., Great Yarmouth*	£192
W. J. Rushmer	198 0		

HASLEMERE.—For works at Frensham Hall (second contract), for the Viscount Emlyn. Messrs. J. W. Simpson & M. Ayrton, Gray's Inn, W.C., architects. Quantities by Messrs. G. M. Simpson & N. Evill :—

J. H. Holden	£3,793 0 0	Goddard & Sons	£3 626 0 5
F. Milton & Sons	3,674 0 0	J. Croad	3,513 10 0

HIGH WYCOMBE.—For erecting new workshops, etc., Mendy-street, for Messrs. Goodearl Bros. Messrs. Hooper & Nash, architects and surveyors, Central Offices, Church-square, High Wycombe, and Gerrard's Cross. No quantities :—

G. H. Gibson	£747	J. Nash & Sons	£624
J. Steevens & Son	658	J. T. Harris*	565
H. Flint	647		

[All of High Wycombe.]

MACCLESFIELD.—For laying 5,450 yds., of cast-iron pipes, etc., for the Rural District Council. Mr. J. Thorpe, Surveyor, 19, King Edward-street, Macclesfield :—

F. Marland	£911	W. Jowett	£602
H. Roberts	859	S. Johnson & Son	558
Taylor & Sons	724	W. Westwood	467
H. H. Barry	704	J. Bentley	461
I. Dean & Co.	695	G. H. York & Co., Wellington and Market Drayton*	433
J. Jackson	632		
R. C. Brebner & Co.	630		

MACCLESFIELD.—For 1,720 yds. of 6-in. stoneware pipe sewers, etc., at Poynton, for the Rural District Council. Mr. J. Thorpe, Surveyor, King Edward-street, Macclesfield :—

I. Dean & Co.	£949	F. Marland	£518
H. Roberts	732	Edmondson & Wyatt	518
J. Jackson	673	Fram Construction Co.	508
W. Jowett	640	Taylor & Son	477
H. H. Barry	571	Clayton Bros.	452
Barker Bros.	558	Gosling & Stafford, Hazel Grove*	405
W. Westwood	546		

MACCLESFIELD.—For the supply of cast-iron pipes, for the Rural District Council. Mr. J. Thorpe, Surveyor, 19, King Edward-street, Macclesfield :—

Stanton Ironworks Co., Ltd.,* 4 in., 5*l.* 10s. 0d. per ton; 3 in., 5*l.* 12s. 6d. per ton; specials, 6*l.* 15s. 0d. per ton.

[Six other Tenders received.]

HACKNEY.—For wood-paving works, High-street, Homerton, for the Borough Council. Mr. Norman Scorgie, Borough Engineer and Surveyor, Town Hall, Hackney :—

—	Improved Wood Pavement Co., Ltd., 46, Queen Victoria-street, E.C.	W. Griffiths & Co., Ltd.	Acme Flooring and Paving Co. (1904), Ltd.	G. J. Anderson.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Take up and remove old wood blocks, prepare and refloat existing concrete foundation, provide and lay new 9-in. by 3-in. by 4½-in. Jarrah wood blocks, and finish complete. Per superficial yard	0 11 6§*	0 11 6	0 12 1‖	0 13 0
Do. but including also for a new 6-in. concrete foundation with 1-in. floating on surface of same. Per superficial yard complete	0 14 7§*	0 15 8	0 14 9‖	0 15 6
Extra excavation (if required) and cartage of surplus per cubic yard	0 5 6*	0 3 0	0 4 6	0 3 6
Extra concrete (if required) per cubic yard	0 14 6*	0 14 3	0 14 6	0 14 0
Extra floating material (if required) per cubic yard	1 1 0*	0 19 0	0 19 0	1 3 0

§ Same prices for Blackbutt wood blocks.

‖ Alternative Tender also submitted for "Acme Sectional" block paving at prices of 12s. and 14s. 8d. respectively per superficial yard.

MARKET DEEPING.—For pulling down farmhouse and erecting new house, for Mr. F. W. Jerrard. Messrs. J. G. Stallebrass & Sons, architects and surveyors, North-street, Peterborough. Quantities by architects :—

S. C. Smith, St. James, Deeping, near Peterborough* £397 17

NOTTINGHAM.—For sewering part of Breck Hill Freehold Land Association, Mapperley Plains. Mr. J. Lamb, surveyor, Ashbourne Chambers, Bridlesmith Gate, Nottingham :—

J. Lane	£103 12 0	J. Margerison & Co.	£81 10 0
P. Gaven	102 8 0	J. Herring & Son	75 0 0
C.E.Coxon & Co.	100 10 2	C. Raynor	74 6 8
Lock, Andrews, & Price.....	100 4 0	Cannam Bros. ..	58 15 8
G. Baron & Co...	86 0 0	J. Attenborrow, Nottingham*..	51 0 0
G. W. Wainer ..	85 16 6		
J. Hawley & Son	83 0 0		

PONTYPRIDD.—For private street works, Meadow-terrace, Treforest, for the Urban District Council. Mr. P. R. A. Willoughby, Engineer and Surveyor, Municipal-buildings, Pontypridd :—

G. L. Morgan, Pontypridd* £81 9 10

PONTYPRIDD.—For private street works, lane at rear of Central Hotel, for the Urban District Council. Mr. P. R. A. Willoughby, Engineer and Surveyor, Municipal-buildings, Pontypridd :—

C. Asb, Pontypridd* £106 4 1

PORT TALBOT.—For new premises, Station-road, for Messrs. Griffiths & Sons. Mr. R. O. Clark, architect and surveyor, Port Talbot. Quantities by Mr. Charles Miles, Central-chambers, Newport, Mon. :—

D. Jenkins	£2,797	J. Nicholas	£2,464
S. Rees	2,770	E. G. Clarke	2,430
D. Davies & Sons..	2,700	A. S. Morgan & Co., Newport*	2,349
E. Groom	2,660	E. T. Bevan	2,299
C. H. Reed	2,500		
M. Cox	2,483		

PRESTWICK.—For the construction of sewers from the Foreshore through M'Cubbin's and Potter's Lands and Station-road, Bank-street, Hunter-street, and a portion of Main-street, for the Town Council. Messrs. J. & H. V. Eaglesham, C.E., 24, Wellington-square, Ayr :—

W. Osborne	£2,101 6 7	H. Lapraite	£1,310 14 9
D. Kirkland	1,878 14 5	A. Reid & Son	1,275 18 7
R. Stevenson & Son	1,657 16 7	C. McAndrew	1,255 9 6
		J. Hutchison	1,085 16 10
P. Hastie ..	1,326 1 3	H. Hastie, Ayr	1,063 19 6

RHYDFELIN.—For street works and drainage works, etc., in connexion with workmen's cottages, for the Pontypridd Urban District Council. Mr. P. R. A. Willoughby, Engineer and Surveyor, Municipal-buildings, Pontypridd :—

R. Webb & Son, 39, Mountain Ash-road, Abercynon* £558 19 1

ROCHFORD.—For the erection of Receiving and Mental Wards at the Union Workhouse, for the Guardians. Messrs. Greenhalgh & Brockbank, architects, Southend :—

F. & E. Davey, Ltd., Southend* £2,437

SMITHAM.—For the erection of a new school, and additions to the infants' school, for Surrey Education Committee. Messrs. A. Wickham Jarvis, A.R.I.B.A., Frank A. Richards, M.A., Architects to the Surrey Education Committee, 36, Victoria-street, London S.W. :—

Mitchell Bros..	£7,586 0 0	T. J. Hawkins & Co.	£6,580 2 9
Martin Wells & Co.	6 950 0 0	D. Stewart & Sons.....	6,312 0 0
D. Waller	6,831 0 0	J. & M. Patrick*	6,132 0 0
G. Kemp.....	6,769 0 0		
Smith & Sons..	6,693 0 0		
R. Jones & Son	6,600 0 0		

SOUTHAMPTON.—For the reconstruction of the Chamberlayne Bath at Northam in ferro-concrete on the Hennebique system, for the Corporation. Mr. J. A. Crowther, Borough Engineer :—

Yorkshire Hennebique Contracting Co., Ltd.	£1,212 10 5
F. Bevis	1,142 0 0
R. H. B. Neal, Ltd.	1,077 10 7
Playfair & Toole	1.049 0 0
F. Grace, Southampton*	970 0 0

SOUTHFLEET.—For the construction of reservoir at Southfleet, for the Metropolitan Water Board :—

E. Nuttall & Co.	£8,321 10 2	J. Moran & Son, Ltd...	£4,659 17 3
W. Pattinson & Sons, Ltd.	6,677 0 0	G. E. Wallis & Sons, Ltd. .	4,630 0 0
J. Byrom, Ltd.	6,103 6 8	Kirk & Randall	4,604 0 0
B. E. Nightingale	5,555 0 0	Scott & Branton	4,546 0 0
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J. Aird & Sons	5,289 14 7	W. Underwood & Brother..	4,414 1 9
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T. Smart....	4,882 0 0	R. H. B. Neal, Ltd.....	4,162 7 1
J. Ellingham & Sons....	4,858 9 0	C. Wall, Ltd.	4,097 14 0
A. E. Nunn..	4,837 2 3	G. Bell & Sons, Ltd., Tottenham*	4,042 18 1
W. Muirhead & Co.	4,799 19 11		
J. A. Ewart..	4,741 12 4		

STANWIX.—For sewerage scheme (Contract No. 3), for the Carlisle Rural District Council. Mr. J. Graham, engineer, Bank-street, Carlisle :—

W. Baty, West Walls, Carlisle £4,191 18 5

STANWIX.—For sewerage scheme (Contract No. 2), for the Carlisle Rural District Council. Mr. J. Graham, engineer, Bank-street, Carlisle :—

J. McKay, 13, Chatsworth-square, Carlisle £3,502 17

STANWIX.—For sewerage scheme (Contract No. 1), for Carlisle Rural District Council. Mr. J. Graham, engineer, Bank-street, Carlisle :—

J. McKay, 13, Chatsworth-square, Carlisle £4,672 1 6

TREFOREST.—For private street works, Long-row for Pontypridd Urban District Council. Mr. P. R. A. Willoughby, Engineer and Surveyor, Municipal-buildings, Pontypridd :—

Smith, Jones, & Sons, Pontypridd*.. £360 8 11

WICKFORD.—For erecting new classroom and other alterations and additions at school for Wickford School Managers. Mr. F. Whitmore, Architect, 73, Duke-street, Chelmsford :—

Allen & Gowers ..	£516 15	A. S. Hart	£295 10
F. W. Burtwell ..	434 0	J. Rayner	295 0
S. Norden	331 10	W. E. Westgate ..	279 0
F. Davey.....	325 0	J. Smith & Son ..	245 0
F. Carter.....	312 0	F. Wright Springfield †	225 0
Snewin Bros., & Co.....	297 0		

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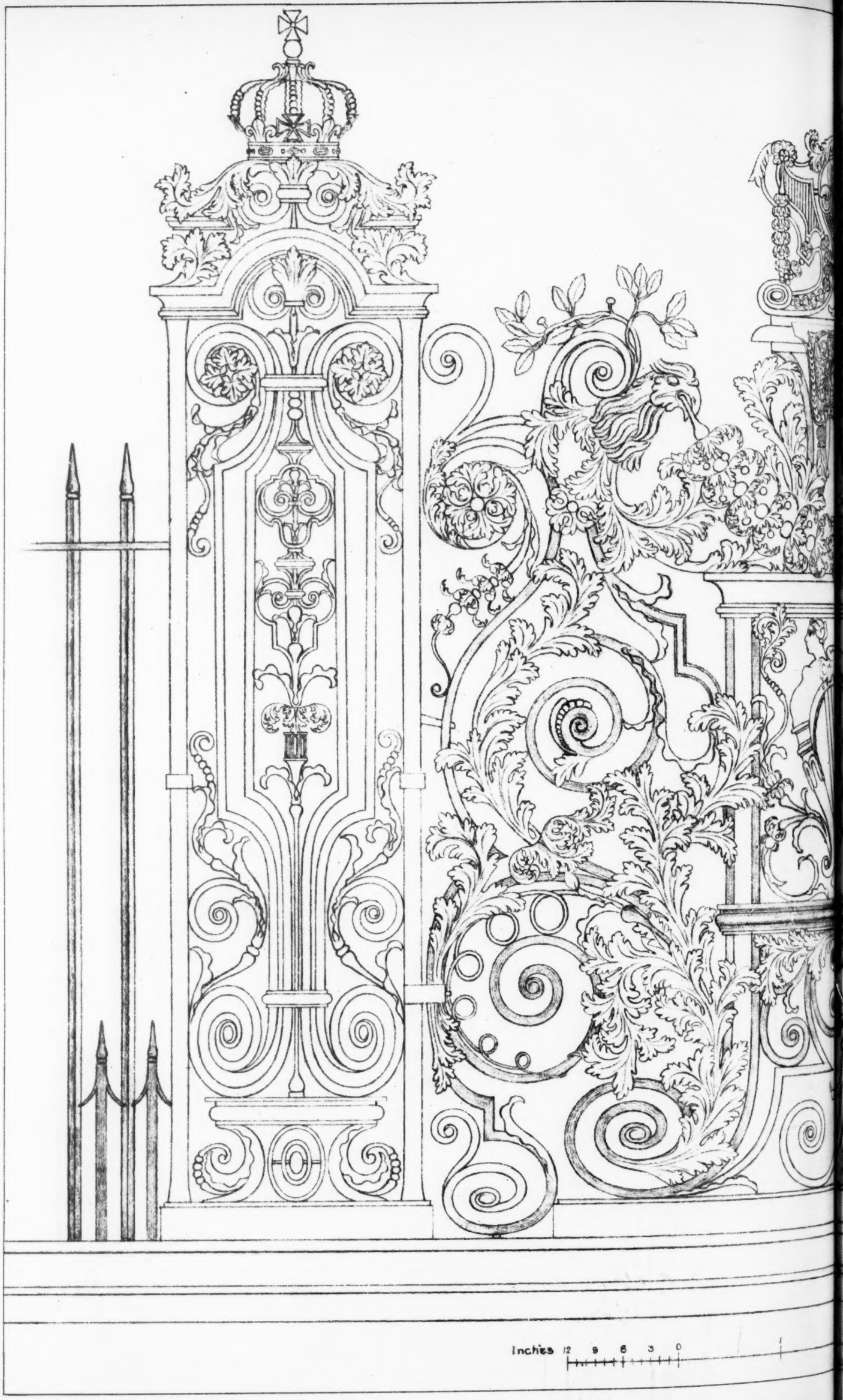

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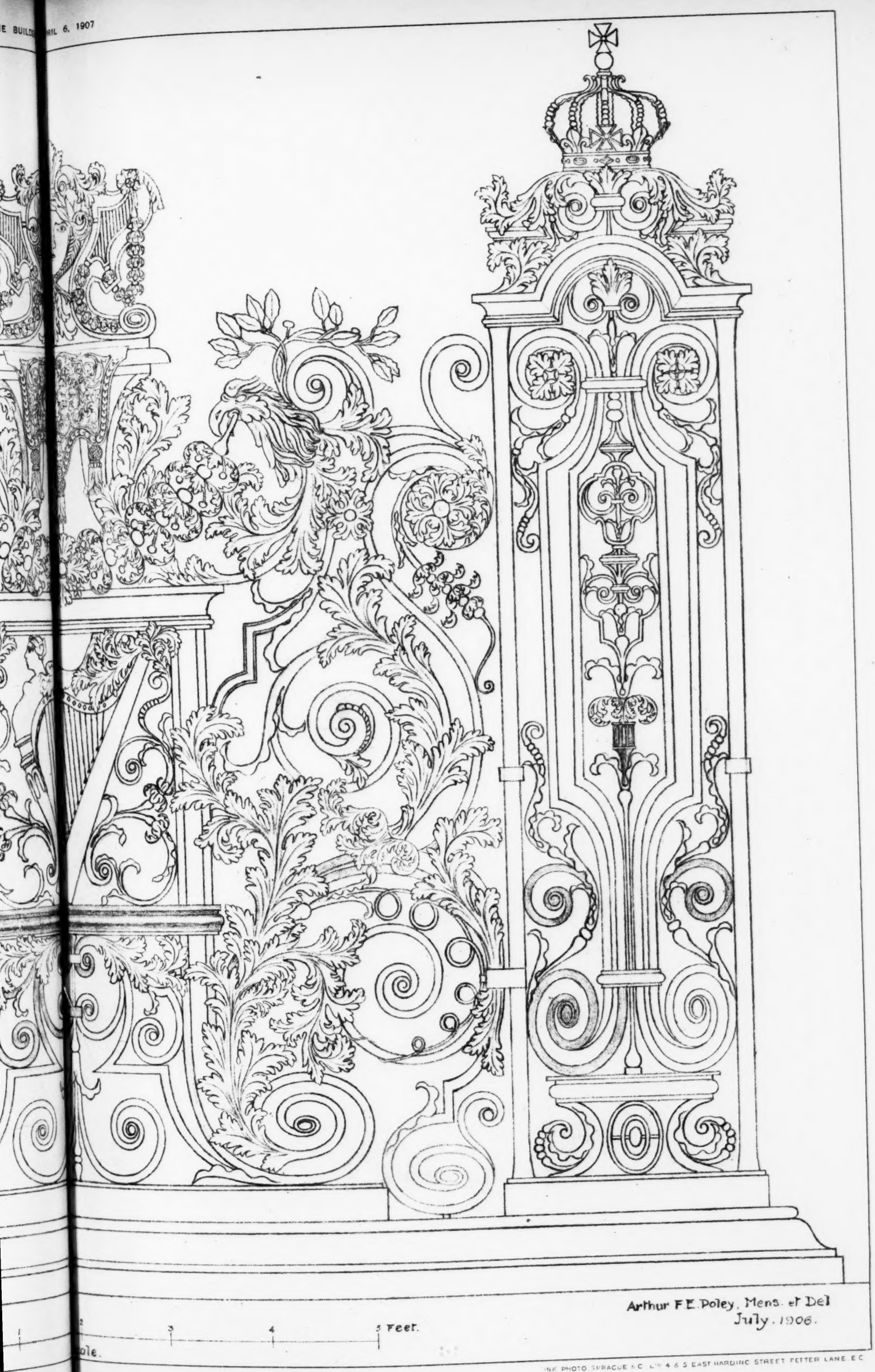

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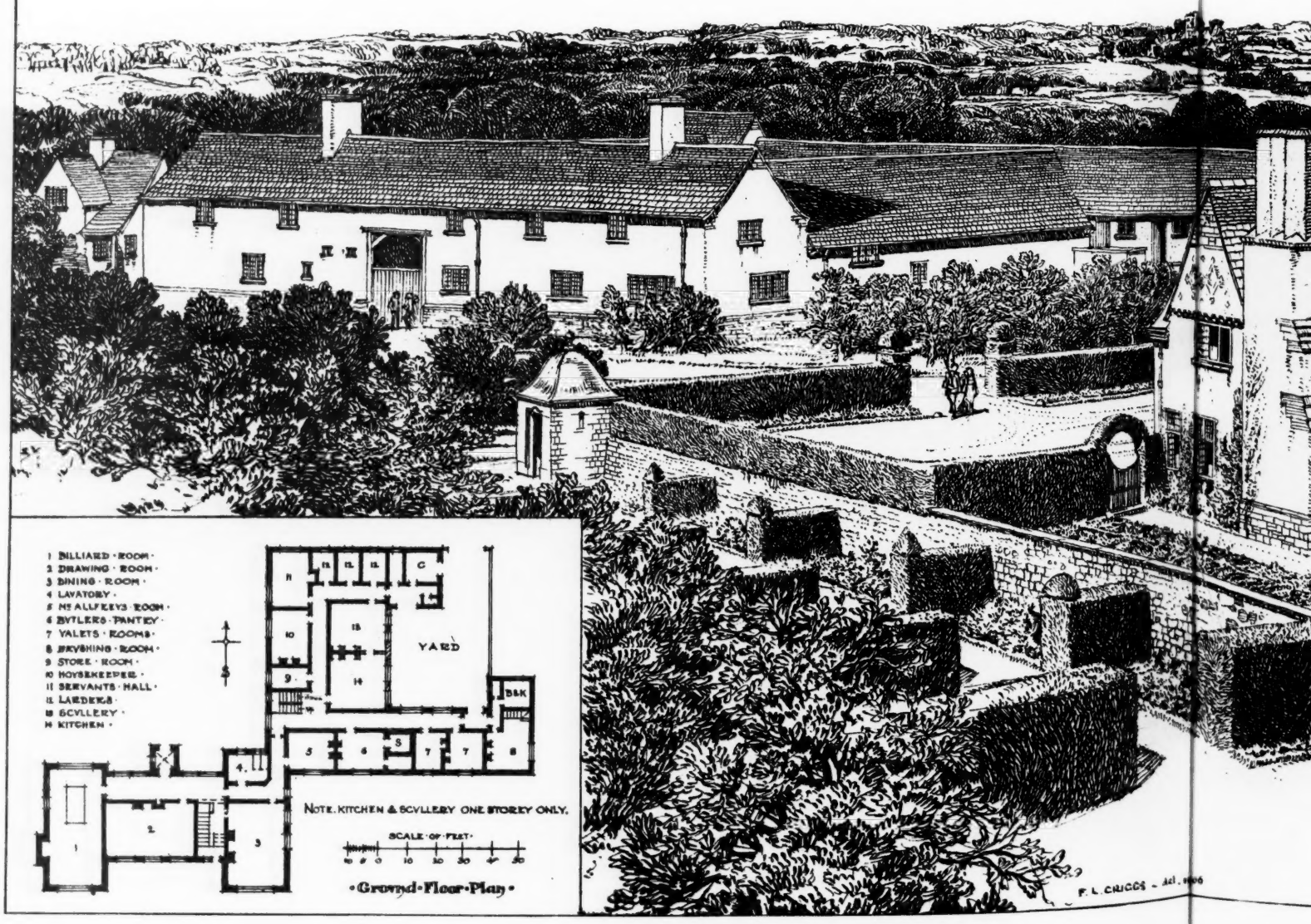

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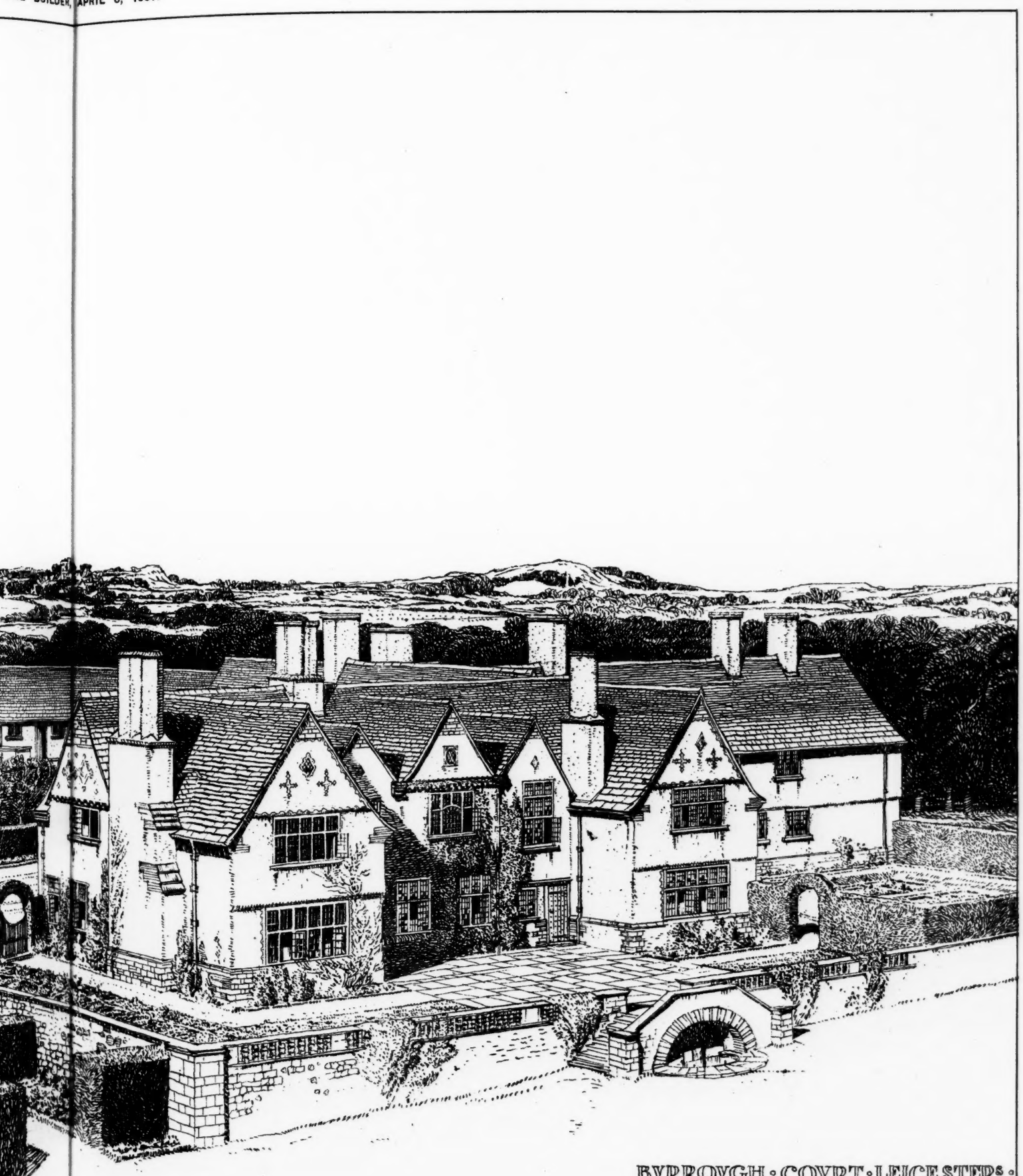

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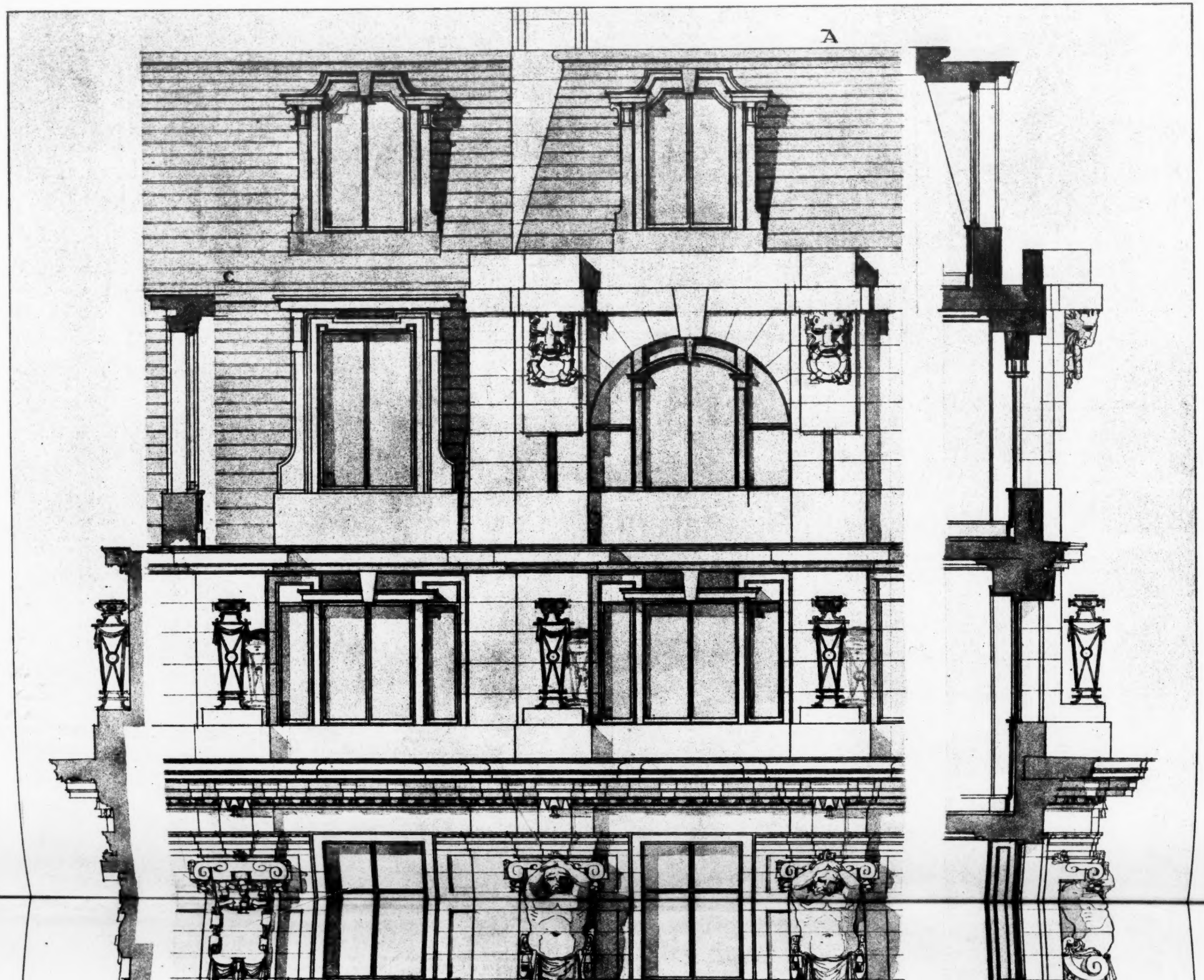
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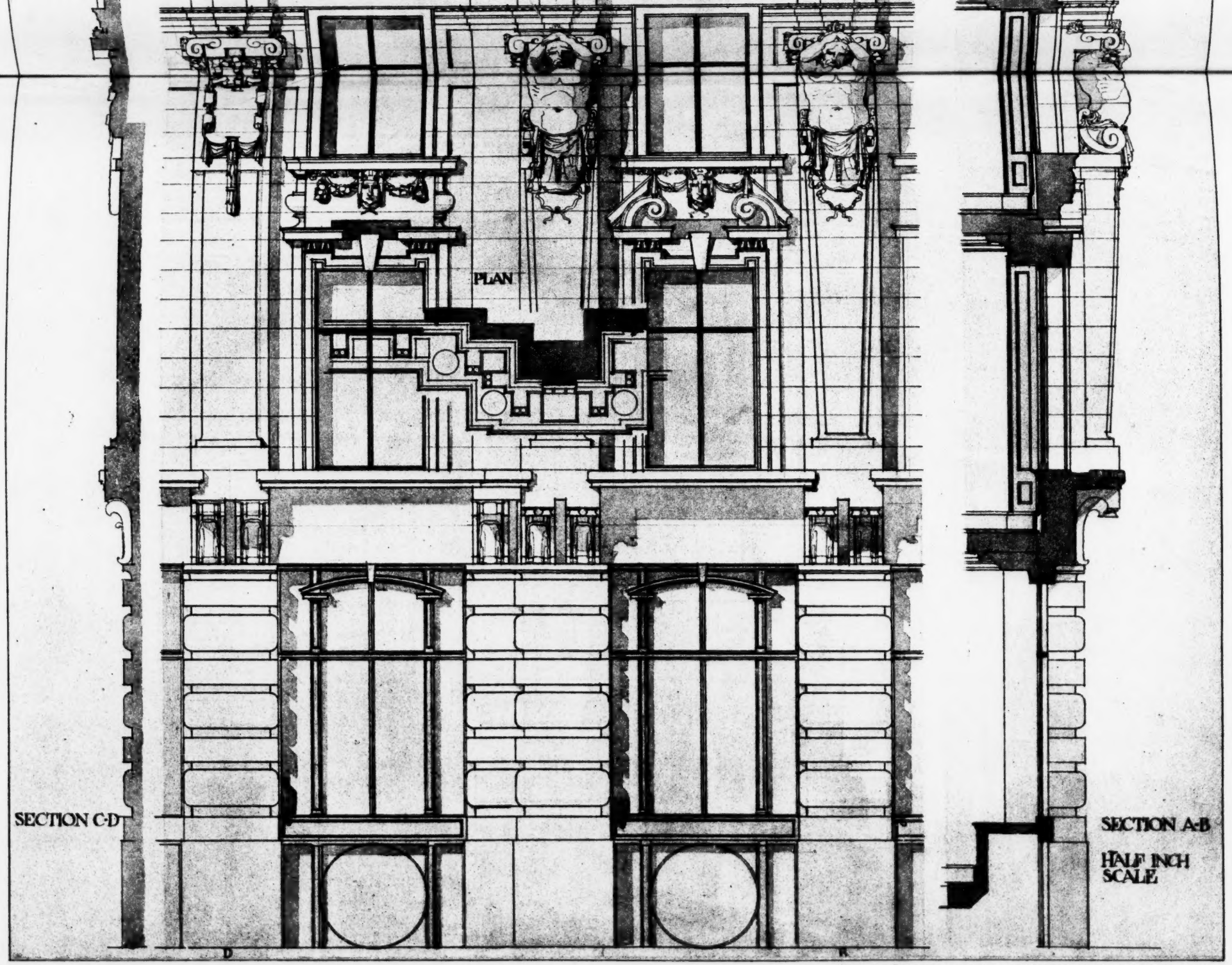

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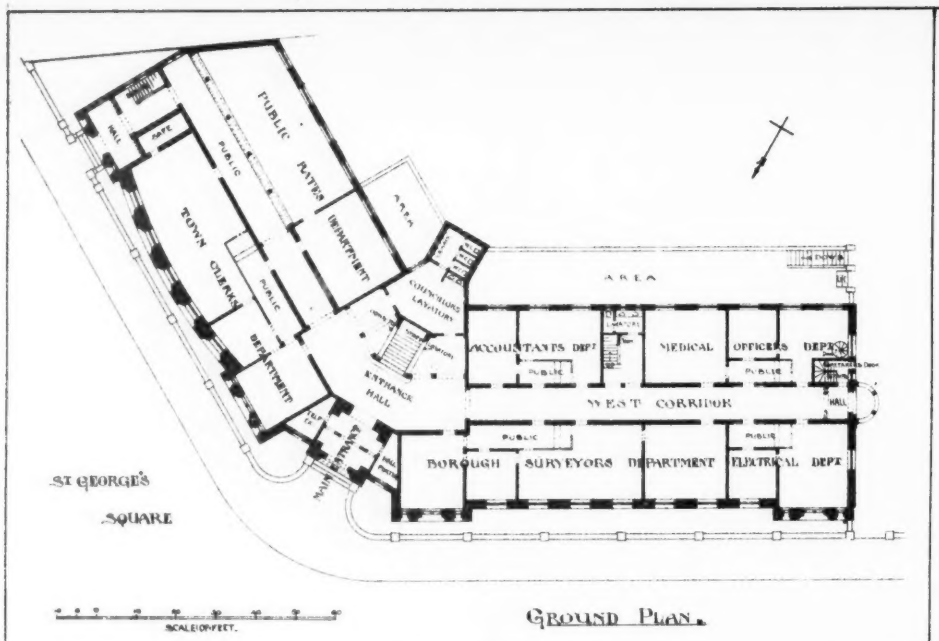
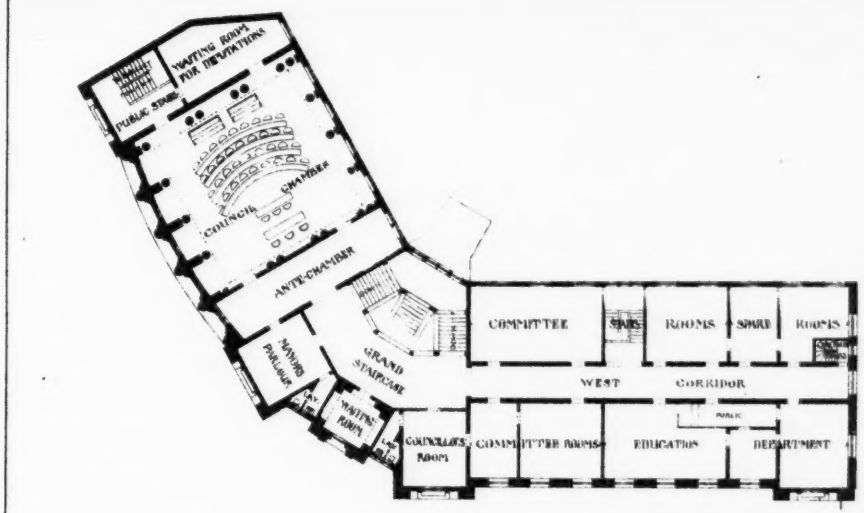
WINCHESTER HOUSE: DETAILS OF FAÇADE TO LONDON WALL.—Mr. John Belcher, A.R.A., Architect.

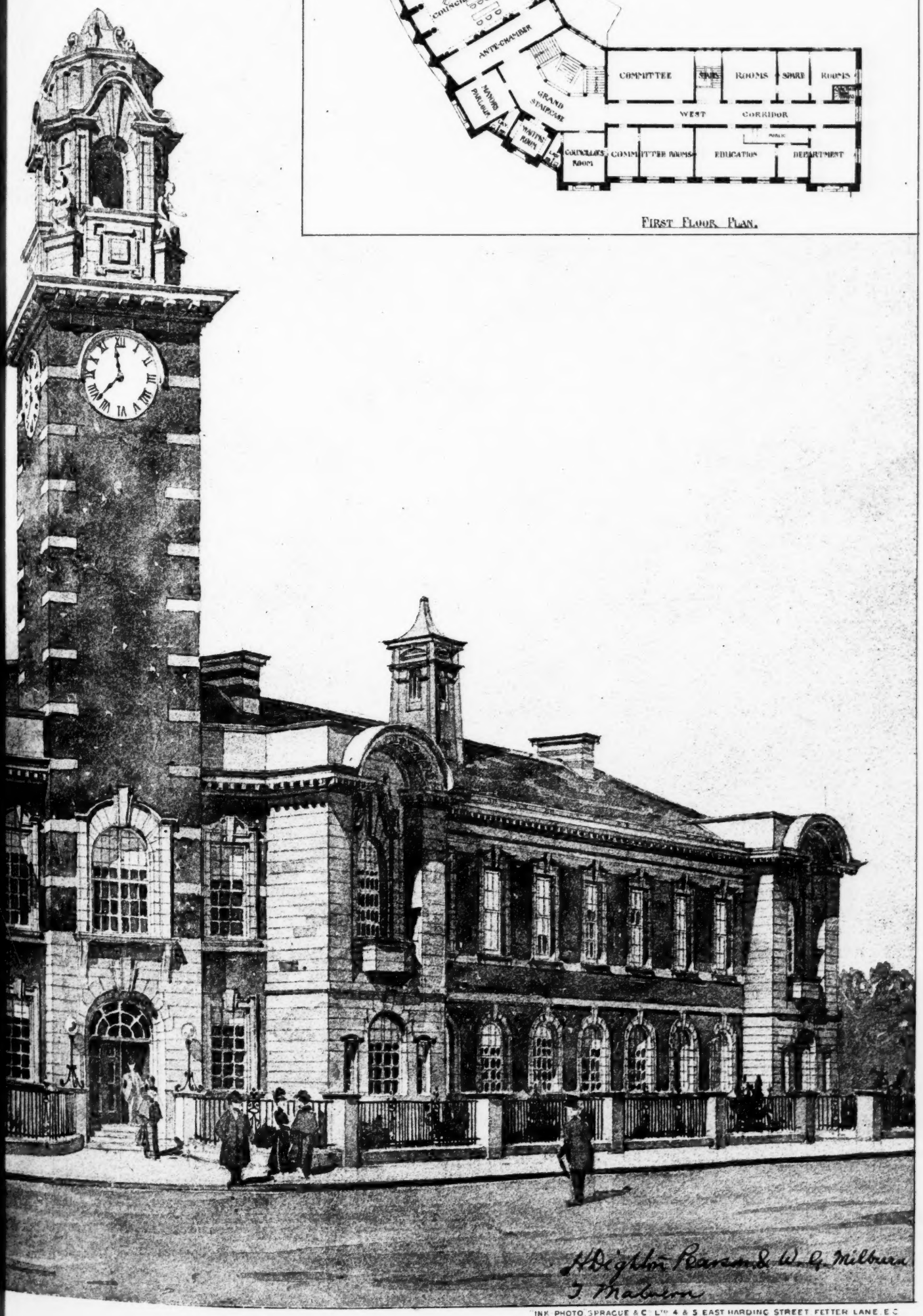


GROUND PLAN.

DESIGN FOR MUNICIPAL OFFICES, CHELTENHAM.—BY MESSRS. PEARSON & MIL



FIRST FLOOR PLAN.



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